

SEVEN NEW SPECIES AND ONE NEW VARIETY OF *VALERIANA*
(VALERIANACEAE) FROM MEXICO

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ABSTRACT

Seven new species of *Valeriana* endemic to Mexico are described and illustrated. *Valeriana naidae* Barrie is a suffrutescent, simple-leaved dioecious vine similar to *V. subincisa* Benth. *Valeriana otomiana* Barrie, *V. zapotecana* Barrie, *V. chiapensis* Barrie, *V. moorei* Barrie and *V. rzedowskiorum* Barrie are tap-rooted, perennial herbs. *Valeriana tzotzilana* Barrie is a biennial herb, endemic to Chiapas. The subspecies *V. urticifolia* var. *scorpioides* (DC.) Barrie is proposed, based on *V. scorpioides* DC. Additionally, a nomen novum, *V. oaxacana* Barrie, is proposed to replace the illegitimate name *V. affinis* M. Martens & Galeotti. A key to all species known to occur in Mexico is provided.

Key words: Mexico, *Valeriana*, Valerianaceae.

RESUMEN

Se describen e ilustran siete nuevas especies de *Valeriana*, endémicas de México. *Valeriana naidae* Barrie es una enredadera dioica, sufrutescente, de hojas simples, similar a *V. subincisa* Benth. *Valeriana otomiana* Barrie, *V. zapotecana* Barrie, *V. chiapensis* Barrie, *V. moorei* Barrie y *V. rzedowskiana* Barrie son hierbas con raíces perennes. *Valeriana tzotzilana* Barrie es una hierba bianual, endémica de Chiapas. Se propone la subespecie *V. urticifolia* var. *scorpioides* (DC.) Barrie, basada en *V. scorpioides*. Además se propone un nomen novum, *V. oaxacana* Barrie, que substituye al nombre ilegítimo *V. affinis* M. Martens & Galeotti. Se presenta una clave para todas las especies conocidas de México.

Palabras clave: México, *Valeriana*, Valerianaceae.

Valeriana (Valerianaceae) is a genus of approximately 350 species distributed throughout the Americas, Europe and Asia. Four species are endemic to Africa. Nearctic valerians are either rhizomatous or tap-rooted perennial herbs. In South America, home to roughly half the species in the genus, extensive morphological radiation has produced a broad range of herbs, shrubs and vines, including many highly specialized endemics of the paramo, puna and other high elevation, montane habitats.

Approximately 45 species of *Valeriana* are found in Mexico. These may be divided for descriptive purposes into three groups: biennial herbs, tap-rooted perennial herbs and

herbaceous or suffrutescent vines. None of the rhizomatous herbs that comprise the majority of the valerian flora of the United States and Canada occur in Mexico with the exception of *Valeriana arizonica* A. Gray, which has been collected in northernmost Coahuila. A second predominately U.S. species, the tap-rooted *Valeriana edulis* Torrey & A. Gray, occurs sporadically at high elevations as far south as Cerro Potosi in Nuevo Leon, where it was collected above the timber line, at 3750 m. Most Mexican valerians are endemic; only a half-dozen species have ranges extending beyond its borders. Four are weedy species occurring as far south as Peru and Brazil. Two of these species are also found in the southernmost United States, *Valeriana sorbifolia* Kunth in southeastern Arizona and *Valeriana scandens* L. in central Florida.

Mexican valerians are characterized by having opposite, decussate leaves that are simple to pinnatifid or pinnately compound. The inflorescences are thyrsoid with cymose branches, the ultimate branches often scorpioid. Flowers may be hermaphroditic or unisexual, the plants hermaphroditic, gynodioecious or dioecious. Hermaphroditic flowers are protandrous, the style elongating and becoming receptive up to five days after the anthers have shed pollen. The calyx may be reduced or absent (in *V. pulchella*, *V. pratensis* and some individuals of *V. apiifolia* and *V. deltoidea*), but is more commonly present and pappus-like, involute in flower and spreading in fruit, with 6-25 plumose limbs, 2-8 mm long. The corolla is infundibular to salverform or rotate and typically gibbous at the base, that of pistillate flowers being 1/3 to 1/2 the size of perfect or male flowers, with five lobes, spreading or reflexed at anthesis. The three stamens are inserted on the corolla tube and are exerted to included in male-fertile flowers at anthesis. The single style is surmounted by a three-branched stigma. The fruit is an ovate, pyriform or elliptic cypsela with 3 veins on the abaxial side, 1 on the adaxial side, and 2 along the margins. Often overlooked, the relative positions of the veins on the fruit are a useful character for distinguishing species.

This paper describes seven new species and one new variety and proposes one nomen novum to replace an illegitimate name. A key to all species currently known to occur in Mexico is provided.

Valeriana naidae Barrie, sp. nov. TYPE: Mexico. Distrito Federal: P. N. Desierto de los Leones, 1 km S of the Mexico-Toluca highway, 25 Mar 1985, *Barrie & Nixon 1299* (holotype: MEXU; isotypes: BM, CAS, ENCB, F, IEB, MICH, MO, NY, TEX, US, XAL). Fig. 1.

Differt a *Valeriana subincisa* Benth. habitu dioecio, inflorescentiis ramificantibus profusius et floribus parvioribus.

Suffrutescent, dioecious, perennial vines, clambering over the canopies of shrubs and small trees, branches to 15 m long. Roots fibrous, becoming lignified with age. Stem terete; soft-woody below, grey, gnarled and much-branched; up to 2 cm in diameter; new growth herbaceous, green to purple-maculate; 2-6 mm in diameter; glabrous or with scattered pubescence, the hairs 0.2-0.4 mm long; pubescent to tomentose at the nodes, the hairs 0.5-0.8 mm long; with short branchlets, 5-20 mm long, bearing 2-5 leaf pairs, in the leaf axils along the main branches. Leaves simple, 2.0-12.5 cm long; the petioles 4-37 mm long, 0.5-2.0 mm wide, base connate, pubescent to tomentose, the hairs 0.2-0.7 mm long,

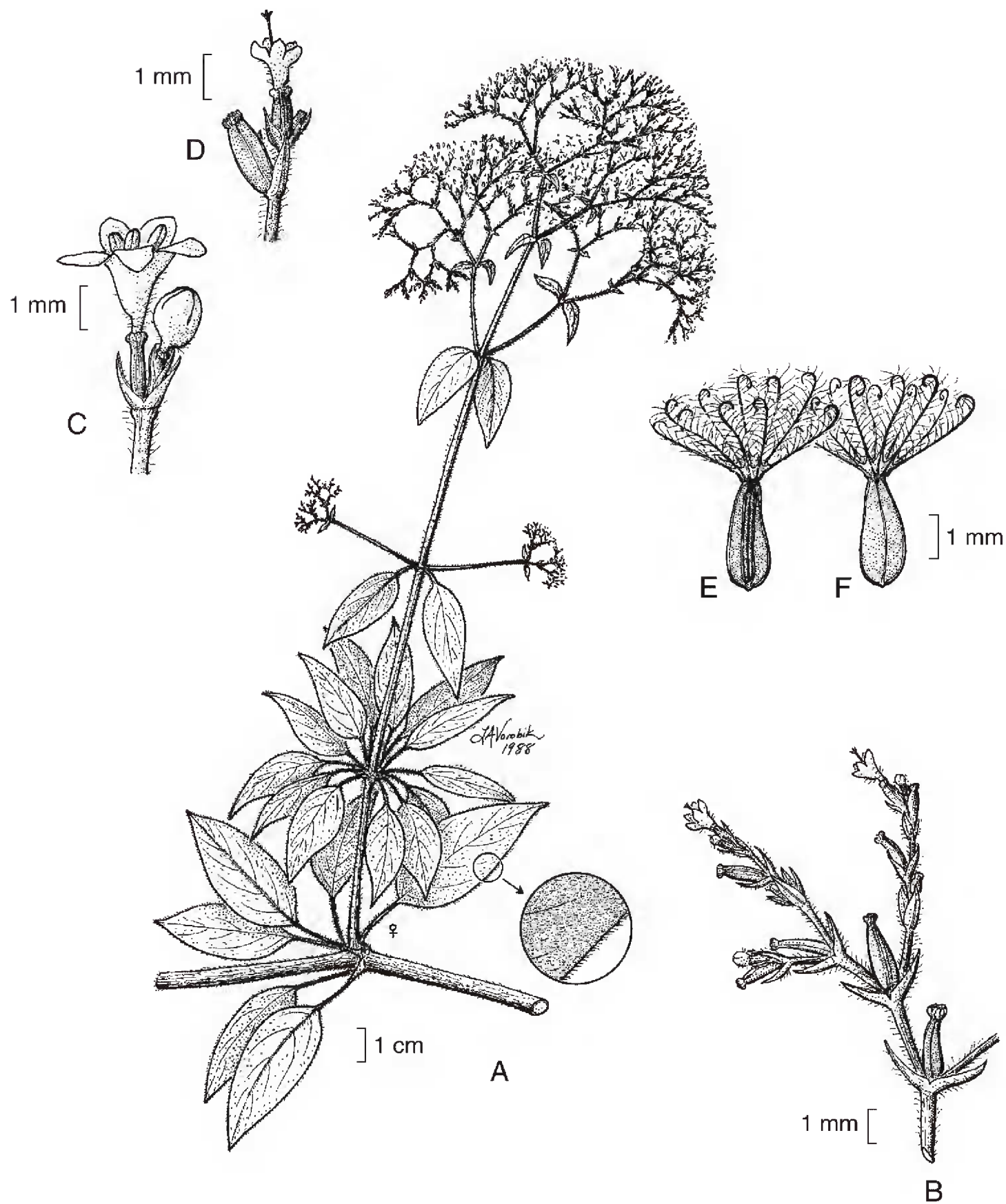


Fig. 1. *Valeriana naidae* Barrie. A. flowering branch; B. terminal branchlet, with female flowers and maturing fruit; C. male flower; D. female flower; E. fruit, abaxial surface; F. fruit, adaxial surface. Fig. C from Paratype, *Barrie & Nixon 1300* (TEX); others from Holotype, *Barrie & Nixon 1299* (TEX).

commonly more densely vested toward the base; the blades 1.5-8.7 cm long, 0.8-4.1 cm wide; ovate to elliptic; base truncate or cuneate, rarely attenuate; apex acute; margin entire to irregularly denticulate; often with white, glandular patches every 5-8 mm; glabrous or ciliate, the hairs 0.3-0.7 mm long; surfaces glabrous to pubescent or tomentose, the hairs 0.2-0.4 mm long, the vestiture sometimes restricted to the veins below, or to the midvein abaxially and adaxially. Inflorescence paniculoid, diffuse, 5-10 cm long, 3-8 cm wide in early flower; 13-28 cm long, 10-25 cm wide in late flower or fruit; lateral branch pairs 1-5, the branches divaricate to ascending, 2-9 cm long; terminal branchlets scorpioid, with 3-6 flowers or fruits; glabrescent to tomentose, the vestiture commonly densest at the nodes. Bracts 1-32 mm long, 1-7 mm wide, linear to lanceolate, base free or connate, apex acute to acuminate, margins entire, ciliate, if only at the base, the hairs 0.2-0.4 mm long, surfaces glabrous or pubescent abaxially. Bractlets shorter than the fruits, 1.5-3.0 mm long, 0.4-0.8 mm wide, lanceolate, base free, apex acuminate, margins scarious, ciliate or glandular-ciliate, surfaces glabrous or pubescent abaxially. Calyx 10-13-fid, the limbs 3.5-5.5 mm long in fruit. Corollas white to pink or rose, the lobes often darker than the tube, rotate to infundibular, gibbous, glabrous or with scattered hairs without, 0.1-0.3 mm long, pilose within, the hairs 0.3-0.6 mm long; the corollas of males 1.8-3.6 mm long, the tube 1.1-2.4 mm long, 0.8-1.4 mm wide, the lobes 0.7-1.2 mm long, 0.5-1.1 mm wide, apices rounded, spreading to recurved at anthesis; corollas of females 1.1-1.9 mm long, the tube 0.6-1.2 mm long, the lobes 0.5-0.8 mm long, 0.4-0.6 mm wide, apices rounded, spreading or ascending at anthesis. Stamens weakly to strongly exerted, 0.7-1.7 mm long; the filaments 0.5-1.2 mm long, adnate for 2/5-2/3 of the length of the tube; the anthers 0.5-0.9 mm long. Style 1.2-2.1 mm long; stigmas 0.1-0.3 mm long. Cypselas tan or purple-maculate, 2.2-2.7 mm long, 0.9-1.1 mm wide, oblong to lanceolate, adaxial, abaxial and marginal veins simple, adaxial lateral veins parallel to the midvein, surfaces glabrous or glandular.

Phenology: Flowering Oct-May, fruiting Oct-May throughout most of its range. Populations on Nevado de Colima flowering Mar-Jun, fruiting May-Jul.

Distribution: Fir forests and cloud forests from northern Oaxaca and Pico de Orizaba, across the Sierra Volcanica Transversal from Cerro de Perote, Veracruz, to eastern Michoacan, 1650-3400 m. Also on Nevado de Colima, Jalisco, 2400-3350 m.

Representative specimens. **Distrito Federal:** Desierto de los Leones, *Barrie & Nixon 1300* (MEXU, TEX); *Hernández M. 469* (LL, MEXU, MO, NY, UC); Milpa Alta, *Duncan 22406* (MICH); Hwy 15, just E of La Venta, *Dunn 17092* (ENCB); Cañada de Contreras, *García 33* (ENCB); Eslava, *Pringle 8901* (BRIT, CAS, E, F, GH, L, MEXU, MICH, MO, NY, UC, US, W); Cerro Conejo, *Rzedowski 2352* (ENCB); San Lorenzo, *Ventura A. 1039* (CHAPA, ENCB, MEXU, MICH); Cerro de Chimetlacalo, *Ventura A. 1251* (ENCB, MEXU); San Salvador, *Ventura A. 2480* (CHAPA, ENCB, MEXU, MO); Xochimilco, Esquihuil, *Ventura A. 2574* (CHAPA, ENCB, MEXU, MICH); Xochimilco, Santa Cecilia, *Ventura A. 2585* (CHAPA, ENCB, MEXU, MICH, MO); A. Obregón, Santa Rosa, *Ventura A. 2633* (ENCB, MEXU); Contreras, Rancho de Pachita, *Ventura A. 3134* (ENCB, MEXU); Milpa Alta, Santa Ana, *Ventura A. 900* (CAS, ENCB, MEXU). **Guerrero:** Mpio. Tlacotepec, Cerro Teotepec, *Rzedowski 16517* (ENCB). **Jalisco:** Mpio. Zapotitlán, Nevado de Colima,

NW slopes, *McVaugh 10063* (GH, LL, MEXU, MICH, MO, US, TEX), *Pringle 4390* (BR, F, GH, MEXU, MICH, MO, NY, UC, US, W). **Mexico:** Atlautla, Mt. Popocatepetl, *Balls 4217* (E, GH, UC, US); Mpio. Ixtapalapa, Campo Experimental de Zoquiapan, *Calderón F. 86* (WIS); Mpio. Tlalmanalco, 3 km E of San Rafael, *Cruz C. 1638* (CAS, ENCB); Mpio. Amecameca, 9.5 km SE of Amecameca, *García P. 267* (CAS, CHAPA, ENCB, MEXU, MO); Mpio. Texcoco, 9 km SE of Tequesquináhuac, *García P. 614* (CAS, CHAPA, ENCB, F, MEXU, MO, WIS); Mpio. Temascaltepec, Meson Viejo, *Hinton 2732* (GH, MO, NY, US); Mpio. Amecameca, carretera al Popocatepetl, *Lyonnet 2122* (ENCB, MEXU, US); Mpio. Villa Guerrero, la barranca del Puente de Calderón, *Matuda et al. 28211* (MEXU, MO); Ixtaccíhuatl, *Purpus 1782* (F, GH, MO, NY, UC, US); Mpio. Amecameca, carretera a Tlamacas, *Rzedowski 19169* (CAS, ENCB, MEXU, MICH, TEX); Mpio. Santiago Tlazala, alrededores de la Presa Iturbide, *Rzedowski 30178* (ENCB, MEXU); Mpio. Texcoco, Santa Catarina, *Ventura V. 496* (ENCB, MEXU, NY). **Michoacan:** Mpio. Zitácuaro, Cerro Cacique, NW slope, *Ibarra C. 429* (MEXU); Mpio. Ciudad Hidalgo, 2-3 km W of Cerro San Andrés, *McVaugh 9953* (ENCB, GH, LL, MEXU, MICH, MO, TEX, US). **Morelos:** Mpio. Cuernavaca, Sierra de Ocuila, *Lyonnet 2905* (US); S slope of Mt. Ajusco, 24 Dec 1922, *Mexia s. n.* (UC); Mpio. Huitzilac, Barranca Oclatzingo, *Vázquez 2185* (ENCB, MEXU). **Oaxaca:** Mpio. Ixtlán de Juárez, 20 km N of Ixtlan, *Anderson & Anderson 5423* (ENCB, MICH); Comaltepec 4 km S of La Esperanza on road to Ixtlán, *Barrie & Nixon 1364* (MEXU, TEX); Ixtlán de Juárez, km 179, Ixtlán-Tuxtepec hwy, *Benz et al. 599* (XAL); Mpio. Sola de Vega, Cerro San Felipe, *Camp 2392* (CAS, MEXU); Juquila Mixes, Zempoaltepetl, *Camp 2623* (NY); Mpio. Ixtlán de Juárez, entre Llano de Las Flores y Tuxtepec, *Delgadillo M. 124* (MEXU); Yavezia, *Galeotti 2683* (BR, F, US, W); Zempoaltepec, Mpio. Miahuatlan, SE of Miahuatlan, *Nelson 2533* (US). **Puebla:** Campo Experimental, San Juan Tetla, *May Nah 1576* (MEXU); Mpio. Zaragoza, Cerro Totoltepec, *Tenorio L. et al. 8633* (TEX). **Tlaxcala:** Ladera de La Malinche, por encima de Citlaltepec, *Ern 341* (ENCB). **Veracruz:** Mpio. Acajete, Plan de Cedeño, *Calzada 5244* (ENCB, F, XAL); Maltrata, *Matuda 1349* (MEXU, MICH, MO); Mpio. Las Vigas, Dos Hermanos, *Ventura A. 4634* (CAS, ENCB, LL, MICH, TEX).

Valeriana naidae belongs to a group of seven species of suffrutescent vines characterized by hollow, soft-woody stems and simple, ovate to lanceolate leaves. Four taxa are endemic to the Northern Andes, a fifth to Panama and Costa Rica. The sixth, *V. subincisa* Benth., occurs in Guatemala and southeastern Chiapas, and in the Sierra Madre Oriental from central Veracruz northward to Tamaulipas and Nuevo Leon and westward to Queretaro, at elevations above 1500 m. The northern populations are typically stoloniferous and decumbent, forming a loose ground cover on steep, shady slopes. In Guatemala and Chiapas, the species assumes the clambering habit of most members of this group, including *V. naidae*. The ranges of *V. naidae* and *V. subincisa* overlap in western Veracruz, in the regions around Mts. Orizaba and Cofre de Perote.

Aside from growth form, *V. naidae* differs from *V. subincisa* in being dioecious, rather than gynodioecious, and its more diffuse paniculoid inflorescence with smaller flowers, the corollas about one-half the size of those of *V. subincisa*, 2-3.5 mm vs. 3-5.5 mm for male-fertile flowers, 1-1.5 mm vs. 2-3 mm for male-sterile flowers. The younger growth of *Valeriana naidae* also tends to be more pubescent.

This species is named for my wife, Dr. Naida Lehmann.

Valeriana otomiana Barrie, sp. nov. TYPE: Mexico. Hidalgo: Municipio Jacala, 9 km south of Jacala along highway to Zimapan. *Barrie 873* (holotype: TEX; isotypes: MEXU, MICH, MO). Fig. 2.

Herba perennis dioecia, ad 25-150 cm alta. Radix napiformis, 7-10 cm longa, 2-5 cm lata. Caules 1-3, 15-80 cm longi, 2-4 mm lati, glabri. Folia basalia, imparipinnata, 12-45 cm longa; laminae 6-35 cm longae, 3-12 cm latae, ellipticae vel oblanceolatae; foliola 5-13, obovata vel lanceolata, foliola lateralia saepe appendicibus basalibus subtenda, appendices diminutae et ligulatae vel foliola accedentes. Inflorescentia paniculiformis, demum 30-55 cm longa; flores et fructi in fasciculis terminalibus remotis dispositi. Bractee 5-15 mm longae, 0.5-2.0 mm latae, lineares, ad basin discretae vel connatae, apice acutae vel acuminatae, ad marginem scariosae vel incisae, glabrae vel glandulifero-ciliatae. Bracteolae fructibus 3-4plo breviores, 1.0-1.5 mm longae, 0.5-1.0 mm latae, triangulares vel obovatae, ad basin discretae vel connatae, apice acutae, ad marginem scariosae. Calyx 12-fidus, limbo plumoso, 5.4-8.0 mm longo in fructu. Corolla eburnea vel subviridis, rotata, corolla florum masculinorum 2.5-3.5 mm longa, corolla florum femineorum 1.9-2.6 mm. Stamina et stylus exserti. Cypsela 3.5-5.0 mm longa, 1.8-2.6 mm lata, ovata, glabra, venis lateralibus abaxialiter carinatis.

Erect, perennial, dioecious herbs, 0.25-1.5 m tall. Roots napiform, 7.0-10.0 cm long, 5.5-7.0 cm wide, surmounted by 1-3 short caudices. Stem 1 per caudex; 10-70 cm long, 2-4 mm wide; terete, glabrous. Leaves basal only, or with 1-2 cauline pairs in some female plants; imparipinnate, 12-45 cm long; petioles 5-15 cm long, 1-2 mm wide; glabrous or pubescent along adaxial surface; base imbricate; blades 6-35 cm long, 3-12 cm wide; elliptic to oblanceolate; glabrous or pubescent along rachis adaxially; the terminal leaflet slightly larger than the laterals, 20-65 mm long, 15-30 mm wide, ovate to obovate; base truncate or attenuate, apex acute, margin with 3-5 irregular, acute lobes; lateral leaflets in 2-6 pairs, disposed alternately to subequally, 6-60 mm long, 6-25 mm wide, obovate to lanceolate, base cuneate or decurrent, apex acute, margin with 3-5 irregular, acute lobes, the lateral leaflets often subtended by basal appendages that may be reduced and ligulate, or approaching the leaflet in size and shape. Inflorescence paniculoid, 14-30 cm long, 8-12 cm wide in early flower; 30-55 cm long, 10-25 cm wide in late flower or fruit; branch-pairs 4-5, the branches arcuate or ascending; 3-7 cm long in early flower, branches of male plants 14-20 cm long at maturity, the flowers borne in remote terminal clusters; branches of female plants 6-30 cm long in fruit, terminal branching dichasial. Bracts 5.0-6.0 mm long, 0.4-0.6 mm wide, linear, base free or connate, apex acute, margin scarious. Bractlets 1/5 to 1/4 the length of the mature fruit, 1.0-2.2 mm long, 0.5-0.9 mm wide, lanceolate or triangular, base connate, apex acute, margins scarious, glabrous, or ciliate or glandular-ciliate proximally. Calyx 12-fid, the segments 5.4-8.0 mm long at maturity. Corollas cream white to pale green, rotate, glabrous without, having a pilose ring within, the hairs 1.4-1.8 mm long; corollas of male flowers 2.5-3.5 mm long, the tube 1.4-1.8 mm long, 1.7-2.3 mm wide, the lobes 1.1-1.7 mm long, 0.9-1.2 mm wide, triangular, recurved at anthesis; corollas of female flowers 1.9-2.6 mm long, the tube 0.9-1.3 mm long, 1.0-1.3 mm wide, the lobes 1.0-1.3 mm long, 0.6-1.0 mm wide, triangular, ascending to spreading at anthesis. Stamens of male flowers exserted, 1.4-2.0 mm long; the filaments 1.0-1.4 mm long, adnate for 1/3-2/3 of the length of the tube; anthers 0.8-1.1 mm long. Style

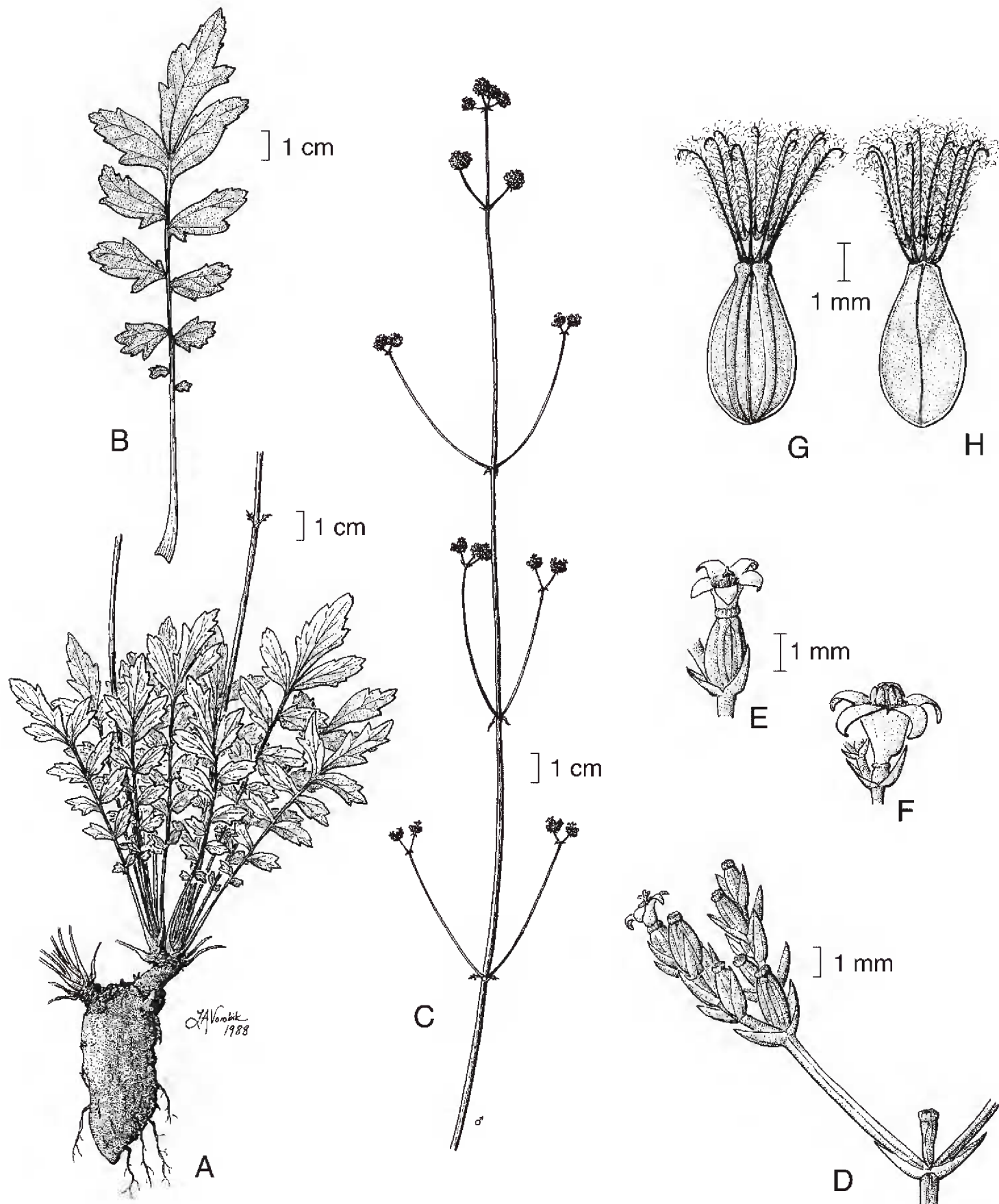


Fig. 2. *Valeriana otomiana* Barrie. A. root and basal leaves; B. basal leaf; C. inflorescence; D. terminal branchlet, with female flower and maturing fruit; E. female flower; F. male flower; G. fruit, abaxial surface; H. fruit, adaxial surface. Drawn from type collection, *Barrie 873*.

1.3-2.2 mm long; stigmas 0.6-1.1 mm long. Cypsela tan, 3.5-5.0 mm long, 1.8-2.6 mm wide, ovate to pyriform, adaxial vein simple, abaxial midvein simple, lateral veins carinate, parallel with the margin, margin entire, surfaces glabrous. Chromosome number $n = 16$ (*Barrie 273*, TEX).

Phenology: Flowering Jul-Oct, fruiting Aug-Nov.

Distribution: Cloud forests along the summit of the Sierra Madre Oriental, northern Hidalgo and eastern San Luis Potosi, 1400-2250 m.

Additional specimens examined. **Hidalgo**: Mpio. Jacala, mountainside, *Chase 7346* (F). **San Luis Potosi**: Ciudad del Maíz, Jul 1893, *Altamirano s. n.* (MEXU); 6.5 km E of Cd. del Maiz on Hwy 180, *Barrie 862* (TEX); 4 mi E of Ciudad del Maiz, *MacGregor et al. 761* (LL, US); El Agujón, ca. 28 km SSW de Río Verde, *Rzedowski 7690* (ENCB).

Valeriana otomiana and the following species, *V. zapotecana*, belong to a well-defined group of seven species of perennial herbs endemic to Mexico. Hoeck (1882) formally recognized this group as *Valeriana* series *Ceratophyllae*. The group members share the characters of a large, napiform to fusiform taproot, 3-20 cm in diameter, predominantly basal compound leaves with 8-16 pairs of lateral leaflets, each leaflet subtended by an appendage that, depending upon the species, may be small and ligulate or approaching the leaflet in size and form, corollas that are strongly gibbous with a well-defined internal collar of sericeous hairs within and fruits with carinate abaxial lateral veins. Along with the species described here, the group includes *V. albonervata* B. L. Robins., *V. calcicola* Greenm., *V. ceratophylla* Kunth, *V. laciniosa* M. Martens & Galeotti and *V. nelsonii* Greenm.

Valeriana otomiana is dioecious, like *V. laciniosa* and *V. zapotecana*. It differs from the former in having coarser, less dissected, leaflets, larger female flowers (corollas 1.9-2.6 vs. 1.2-1.7 mm), smaller male flowers (corollas 2.5-3.5 vs. 3.0-4.1 mm) and smaller fruits (3.5-5 x 1.8-2.6 mm vs. 5.0-6.5 x 3.3-5.0 mm), and from the latter in having larger flowers and glabrous fruits. Both species are found in more xeric sites than *V. otomiana*. It also has been confused with *V. albonervata*, which has pubescent leaves with obovate or obtrullate leaflets, larger flowers and broader fruits.

This species is named for the Otomi, the people native to the region in which it grows.

Valeriana zapotecana Barrie, sp. nov. TYPE: Mexico. Oaxaca: Mpio. Tamazulapan, 12 km S of Miahuatlan on the Oaxaca-Puerto Angel highway, 23 Sep 1984, *Barrie & Leidig 1072* (holotype: TEX; isotypes: F, IEB, MEXU, MO, TEX). Fig 3.

Herba perennis, acaulis, dioecia, ad 35-70 cm alta. Radix fusiformis, 5-10 cm longa, 2-5 cm lata. Folia basalia, imparipinnata, 9-41 cm longa; lamina 7-26 cm longa, 4-10 cm lata, elliptica vel ovata, foliola 7-13, foliola lateralia appendice bifida vel trifida subtenta. Inflorescentia paniculiformis, demum 35-70 cm longa, pubescens. Bracteae 4-17 mm longae, 1 mm latae, lineares, ad basin discretae, apice acuminatae, ad marginem integrae, glabrae. Bracteolae fructu 3-4plo breviores, deltatae vel triangulares, ad basin

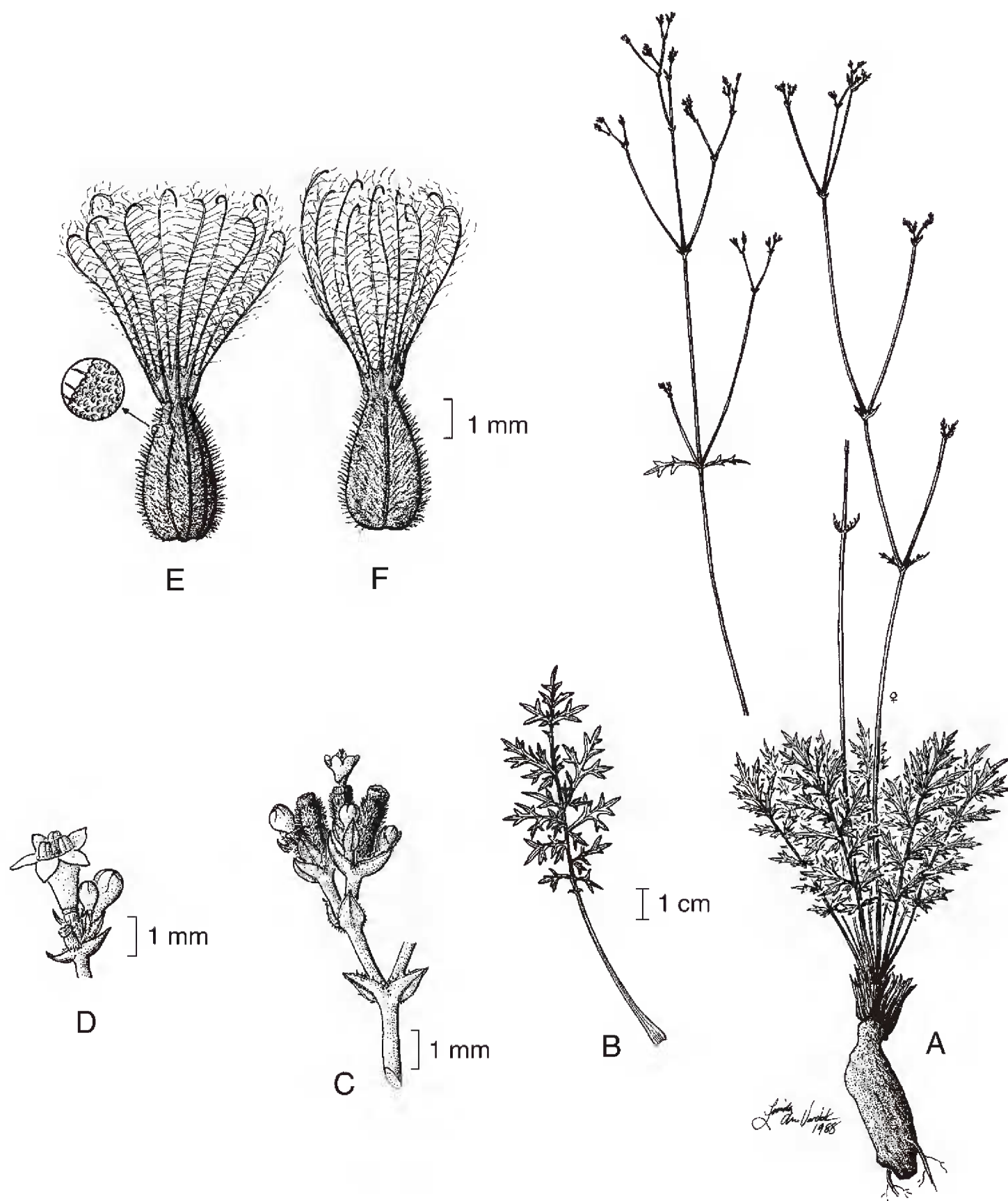


Fig. 3. *Valeriana zapotecana* Barrie. A. habit; B. basal leaf; C. terminal branchlet, with female flower; D. male flower; E. fruit, abaxial surface; F. fruit, adaxial surface. Fig. D drawn from Paratype, Schoenwetter JSOX-62 (ENCB), others from Holotype, Barrie & Leidig 1072 (TEX).

discretae vel connatae, apice acutae, ad marginem scariosae, glandulifero-ciliatae. Calyx 11-13-fidus, limbi plumosi, demum 6.5-8.0 mm longi. Corolla alba, rotata; corolla florum masculinorum 2.4-2.7 mm longa; corolla florum femineorum 1.0-1.2 mm longa. Stamina et stylus exserti. Cypsela fulva vel purpureo-maculata, 3.4-5.0 mm longa, 2.2-2.5 mm lata, ovata, pubescens, venae laterales abaxialiter distaliter carinatae.

Perennial, dioecious herbs to 70 cm tall. Root fusiform, 5-10 cm long, 2-5 cm wide, surmounted by a simple caudex that commonly bears the remnants of old leaf bases. Leaves basal, imparipinnate, 9-41 cm long; petioles 2-12 cm long, 1-3 mm wide; base imbricate, margins ciliate, the hairs 0.2-0.4 mm long, surfaces glabrous or pubescent, the hairs 0.3-0.6 mm long; blades 7-26 cm long, 4-10 cm wide, glabrous or with scattered hairs, 0.2-0.4 mm long, along the rachis; leaflets 6-13; the terminal and lateral leaflets of similar size, 10-55 mm long, 5-25 mm wide, elliptic, the base cuneate or decurrent, the leaflets irregularly lobed or divided, the lobes entire, bifid or trifid, the lobe apices acute or acuminate; the leaflets subtended by bifid or trifid appendages, 1/3-1/2 the length of the leaflets. Inflorescence paniculoid; scapes green to red; 35-70 cm tall, 2-4 mm wide; branches in 2-3 pairs, ascending, 10-20 cm long, the flowers borne in terminal clusters, 1-3 cm in diameter, the clusters expanding in fruit; terminal branching dichotomous; pubescent or pilose proximally, distally glabrous or sparsely pubescent at the nodes only. Bracts 4-17 mm long, 1 mm wide, linear, base free, apex acuminate, margin entire, glabrous. Bractlets 1/4 to 1/3 the length of the mature fruit, 0.6-1.6 mm long, 0.6-1.0 mm wide, deltate to triangular, base free or connate, the apex acute, the margins scarios, glandular-ciliate. Calyx 11-13-fid, 6.5-8.0 mm long at maturity. Corollas white, rotate, strongly gibbous, with a velutinous ring within, the hairs 0.3-0.4 mm long, glabrous without; the corolla of male flowers 2.4-2.7 mm long, the tube 1.5-1.7 mm long, 0.9-1.4 mm wide, the lobes 0.9-1.1 mm long, 0.7-0.9 mm wide, apices rounded; corolla of female flowers 1.0-1.2 mm long, the tube 0.5-0.7 mm long, 0.6-0.7 mm wide, the lobes 0.5-0.7 mm long, 0.6-0.7 mm wide, apices rounded. Stamens weakly to strongly exserted, 1.0-1.4 mm long; filaments 0.7-1.0 mm long, adnate for 1/3-3/3 of the length of the tube; anthers 0.6-0.9 mm long. Style 1.2-1.7 mm long; stigmas 0.2-0.3 mm long. Cypsela tan or purple-maculate, 3.4-5.0 mm long, 2.2-2.5 mm wide, ovate, adaxial vein simple, abaxial midvein simple, lateral veins distally carinate, parallel to margin, margins simple, surfaces pubescent, the hairs 0.3-0.4 mm long.

Phenology: flowering Jul-Sep; fruiting Aug-Sep.

Distribution: Known only from the dry oak forests in the mountains of central Oaxaca, 1800-2200 m.

Additional specimens examined. **Oaxaca**: mountains near Mitla, *Andrieux 326* (K); 15 km SE of Miahuatlán, *Marcks & Marcks 1069* (ENCB, MICH, WIS); 25 miles NW of Cd. Oaxaca, *Rowell et al. 17M539* (TEX); Sierra de la Cumbre, near Mitla, *Schoenwetter JSOX-62* (ENCB).

Valeriana zapotecana is distinguished by its dioecious habit, small flowers and pilose fruits. It has been confused with *V. laciniosa*, from which it differs in that the leaflets

and their divisions are coarser and shorter, the stems and branches of the inflorescence are more slender, and the fruits are smaller and more pubescent. Of the Oaxacan species, it is similar to the gynodioecious *V. calcicola*, but lacks that species' well-developed cauline leaves, purple-lobed corollas and pyriform fruits that are glabrous or pubescent adaxially only.

This species is named for the Zapotec, the people indigenous to the region where it is found.

Valeriana moorei Barrie, sp. nov. TYPE: Mexico. Hidalgo: Distr. Zimapán, lower portion of north-facing cliffs on slopes of Barranca de Tolimán somewhat above the mines on road from Zimapán to Mina Loma del Toro and Balcones, *Moore & Wood 4392* (holotype: BH; isotypes: A, MICH, MO). Fig. 4.

Herba hermaphroditica(?), perennis, ad 60 cm alta. Radix fusiformis vel napiformis, 5-10 cm longa, 1.5-5 cm lata. Caulis 20-25 cm longus; 1-3 mm latus, nonnisi nodis pubescentibus. Folia composita, praecipue basalia cum 1-3 paribus caulinis reductis, 10-42 cm longa; laminae 8.5-28.0 cm longae, 2.8-12.5 cm latae, oblanceolatae vel ellipticae; foliola 7-11, ovata ad latissime ovata, foliolium terminale quam foliola lateralia majus. Inflorescentia paniculiformis, 9 cm longa, nodis puberulis. Bracteae 1.5-5.0 mm longae, 0.6-1.5 mm latae, ellipticae, ad basin connatae, apice acutae, margine integrae, glabrae vel ciliatae vel glandulifero-ciliatae. Bracteolae fructu 2plo breviores, 1.5 mm longae, 0.8 mm latae, ellipticae, ad basin connatae, apice acuminatae, margine scariosae, glabrae. Calyx 10-fidus. Corolla alba, infundibularis, 3.0-3.7 mm longa. Stamina et stylus exserti. Cypsela purpureo-maculata, 3.0-3.2 mm longa, 1.45 mm lata, ovata, abaxialiter pubescens.

Perennial, hermaphroditic(?) herbs to 60 cm tall. Root a fusiform or napiform taproot, 9.0 cm long, 1.5 cm wide, or larger, surmounted by a simple caudex, up to 5 cm long, 2 cm wide; numerous imbricate, desiccated old leaf bases commonly present. Stem 20-25 cm long, 1-3 mm wide in early flower, to 50 cm long in late flower and fruit; pubescent at the nodes, the hairs 0.2-0.4 mm long; otherwise glabrescent. Leaves predominantly basal with 1-3 reduced, cauline pairs, imparipinnate, 10-42 cm long; petioles 3-14 cm long, 2-3 mm wide; bases imbricate, margins ciliate, the hairs 0.2-0.4 mm long; blade 8.5-28.0 cm long, 2.8-12.5 cm wide, oblanceolate to elliptic; the veins on lower surface hispidulous to pubescent, the hairs 0.2-0.4 mm long; veins on upper surface with scattered pubescence; surfaces glabrous otherwise; the terminal leaflet larger than the laterals, 2.7-9.0 cm long, 1.8-9.0 cm wide, ovate to very widely ovate, base truncate or cuneate, apex acute, margins with 8-12 irregular, triangular lobes, ciliate, the hairs 0.4-0.6 mm long; lateral leaflets in 3-5 opposite or alternate pairs, 6-75 mm long, 7-45 mm wide, ovate to very widely ovate; margins with 5-10 irregular, triangular lobes, ciliate, the hairs 0.4-0.6 mm long. Inflorescence paniculoid, capitate and 1.5 cm long, 1.5 cm wide in bud and early flower; 9 cm long, 8 cm wide in late flower and fruit; lateral branches 2-3 pairs; ascending; 3-6 cm long in late flower and fruit; terminal divisions scorpioid, bearing 3-4 flowers or fruits; inflorescence glabrescent or puberulent at the nodes only, the hairs 0.1-0.2 mm long. Bracts 1.5-5.0 mm long, 0.6-1.5 mm wide, elliptic, base connate, apex acute, margin entire, glabrous, ciliate or glandular-ciliate. Bractlets 1/2 the length of

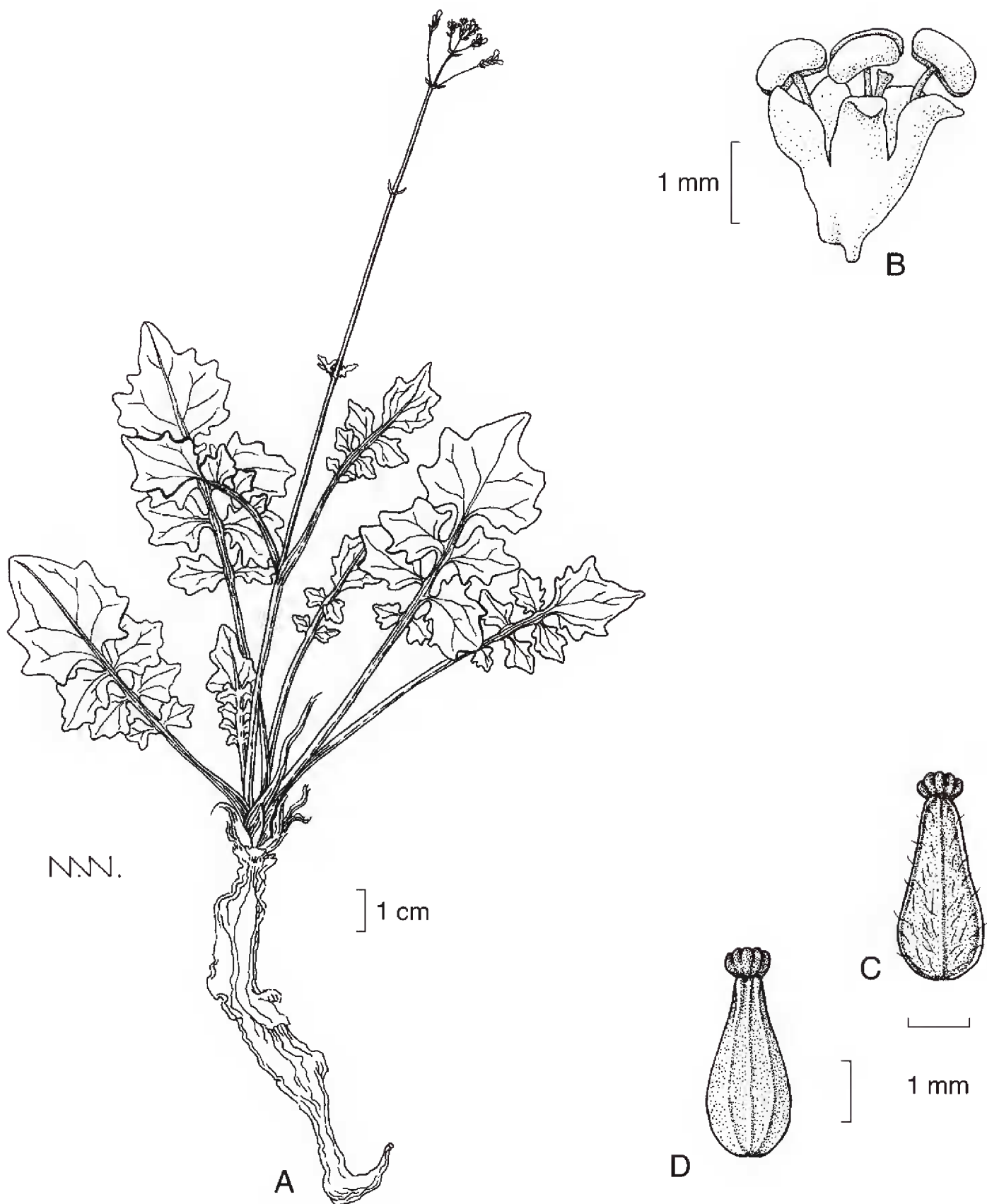


Fig. 4. *Valeriana moorei* Barrie. A. habit; B. flower in early anthesis, the style not fully elongated; C. fruit, adaxial surface; D. fruit, abaxial surface. Drawn from type collection, Moore & Wood 4392.

the mature fruits, 1.5 mm long, 0.8 mm wide, elliptic, base connate, apex acuminate, margin scarious, glabrous. Calyx 10-fid, length at maturity unknown. Corolla white, infundibular, gibbous, glabrous without, with scattered hairs, 0.3-0.5 mm long, within; corollas 3.0-3.7 mm long, the tube 1.9-2.2 mm long, 0.6-0.9 mm wide, the lobes 1.2-1.5 mm long, 0.8-1.0 mm wide, apices rounded. Stamens exserted, 1.3-1.8 mm long; the filaments 0.8-1.2 mm long; anthers 1.0 mm long. Style 1.5-2.0 mm long; stigmas 0.6 mm long. Cypsela purple-maculate, 3.0-3.2 mm long, 1.5 mm wide, ovate, veins simple, abaxial lateral veins parallel to midvein, surfaces granular, pubescent on adaxial surface only, the hairs 0.3-0.4 mm long.

Phenology: Flowering Aug-Nov, fruiting Sep(?)–Nov.

Distribution: Dry limestone slopes in northwestern Hidalgo, in the mountain range west of Zimapán north to Jacala, 1600 m. Associated with *Juniperus flaccida* at the Jacala site.

Additional specimen examined: **Hidalgo**: 3 km al N de Jacala, *Rzedowski 27678* (ENCB).

Valeriana moorei is most distinctive for its compound leaves with the marked, hispidulous lower veins. The large, predominantly basal, compound leaves and stout taproot suggest a possible relationship with the members of series *Ceratophyllae*. However, *V. moorei* lacks leaflet appendages, the pilose collar within the corolla and the carinate fruits. The stout caudex bearing old leaf bases suggest a possible relationship between this species and *V. cucurbitifolia* of Chiapas and Oaxaca. The overall shape of the leaflets and of the fruits support this as well.

This species is known from only two collections. The plants of the type collection are in bud and early flower. The leaves are well developed, but small (10-18 cm long). The paratype is a much more mature specimen with a fully expanded inflorescence and much larger leaves (35-42 cm long). None of the specimens is female and it may be that the species is hermaphroditic. However, the lack of female specimens may be an artifact of too few collections.

Both collections of *V. moorei* have been made in the “matorral de *Juniperus flaccida*” (Rzedowski, 1978), a transition zone between the wetter pine-oak zone of higher elevations, and the more xeric habitats below.

This species is named for the Dr. Harold E. Moore, Jr., who made the type collection.

Valeriana rzedowskiorum Barrie, sp. nov. TYPE: Mexico. Distrito Federal: Serrania de Ajusco, 6 Sep 1896, *Pringle 6466* (holotype: MEXU; isotypes: BM, BR, CAS, E, F, GH, MICH, MO, NDG, NY, UC, US, VT, W). Fig. 5.

Herba perennis gynodioecia, ad 25-85 alta. Radix globosa vel fusiformis, 1.0-3.5 cm longa, 1.0-2.5 cm lata. Caulis 11-6 cm longus, 1.0-2.5 mm latus, inferne pubescens. Folia caulina, 3-4 paria, imparipinnata, 3-17 cm longa; lamina 2.7-12.0 cm longa, 1.8-7.0 cm lata, elliptica ad obovata, glabra vel ciliata in axillis foliolorum, foliolum terminale quam

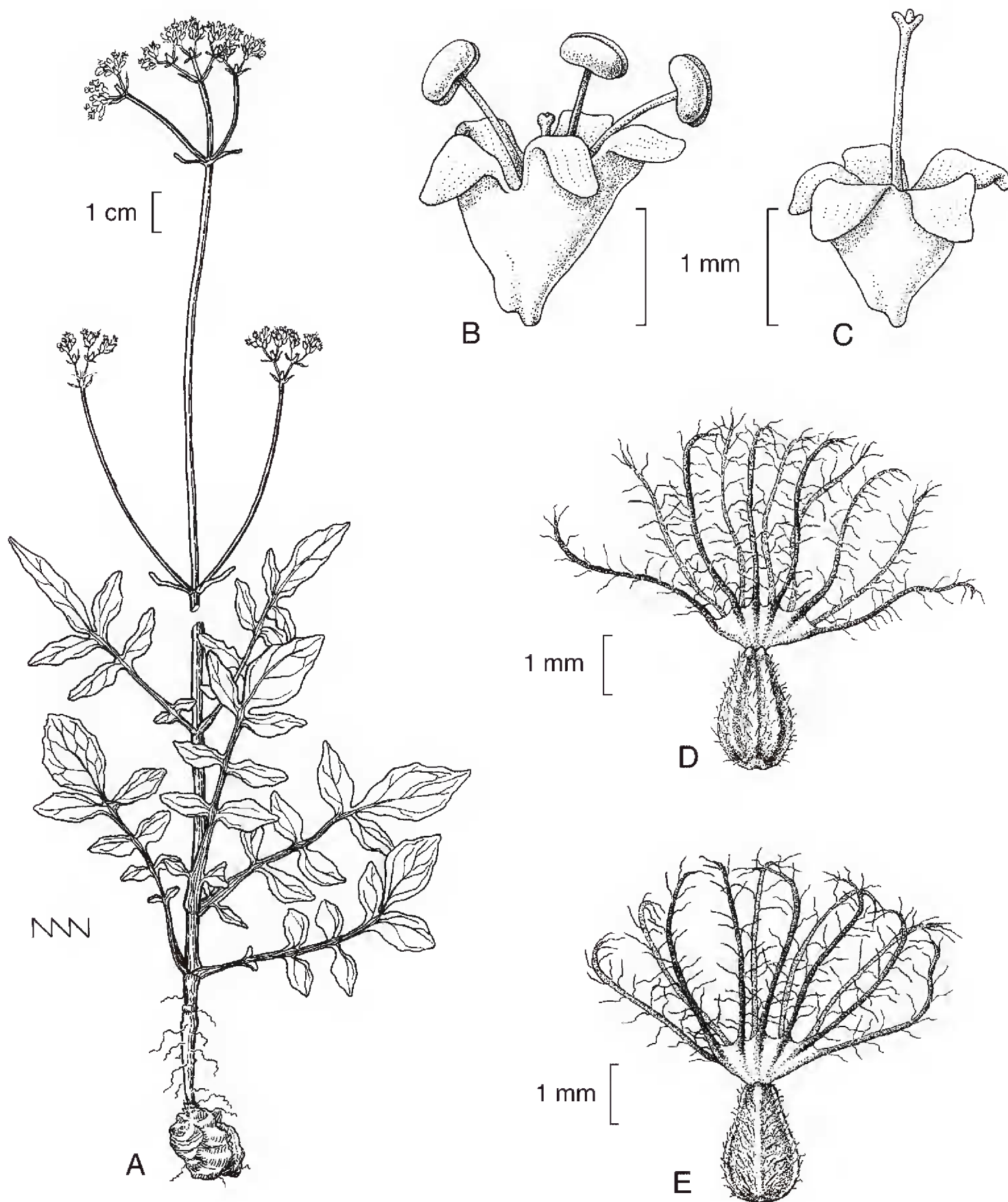


Fig. 5. *Valeriana rzedowskiorum* Barrie. A. habit; B. hermaphroditic flower in early anthesis, the style not fully elongated; C. female flower; D. fruit, abaxial surface; E. fruit, adaxial surface. Drawn from type collection, *Pringle 6466*.

foliola lateralia majus. Inflorescentia paniculiformis, 20-45 cm longa in fructu, nodis pubescens vel hirsuta. Bracteae 3-25 mm longae, 0.6-5.0 mm latae, lineares vel ellipticae, basi connatae, apice acuminatae, margine integrae vel 3-5-lobatae. Bracteolae fructu aequantes vel paulo superantes, 1.5-3.0 mm longae, 0.3-0.6 mm latae, lineares, basi discretiae, apice acuminatae, margine scariosae. Calyx 10-12-fidus, limbo plumoso, 3.5-4.7 mm longo in fructu. Corolla alba vel rosea infundibularis; corolla florum hermaphroditum 2.3-3.5 mm longa, corolla florum femineorum 1.5-2.3 mm longa. Stamina et stylus exserti. Cypsela purpureo-maculata, 1.7-2.5 mm longa, 1.2-1.6 mm lata, ovata, pubescens utrinque.

Erect, perennial, gynodioecious herbs, 25-85 cm tall. Roots globose to fusiform, 1.0-3.5 cm long, 1.0-2.5 cm wide. Stem green; 11.5-65 cm long, 1.0-2.5 mm wide; glabrous or with scattered hairs, 0.2-0.4 mm long, basally. Leaves cauline, 3-4 pairs, imparipinnate; 3-17 cm long, petioles 5-45 mm long, 1-4 mm wide; connate; glabrous or ciliate basally; blades 2.7-12.0 cm long, 1.8-7.0 cm wide, elliptic to obovate; glabrous or tufted-ciliate in the axils of the leaflets; the terminal leaflet larger than the laterals; 17-55 mm long, 8-30 mm wide; ovate to elliptic or obovate; base cuneate, often merging with the margins of the upper pair of lateral leaflets; apex acute; margins entire or rarely denticulate; surfaces glabrous; lateral leaflets in 1-8 pairs, disposed oppositely or subequally; 5-41 mm long, 2-17 mm wide, ovate to elliptic; base decurrent, apex acute; margins entire. Inflorescence paniculoid, 3-10 cm long, 2-4 cm wide in early flower, expanding to 20-45 cm long, 9-15 cm wide in late flower or fruit; branches ascending, 1-7 cm long in flower, 5-20 cm long in late flower or fruit; terminal branchlets scorpioid, bearing 2-3 flowers or fruits; pubescent to hirsute at the nodes, the hairs 0.2-0.5 mm long. Bracts 3-25 mm long, 0.6-5.0 mm wide, linear to elliptic, base connate, apex acuminate, margins entire or 3-5-lobed, ciliate basally, surfaces glabrous. Bractlets equal to or slightly longer than the mature fruits, 1.5-3.0 mm long, 0.3-0.6 mm wide, linear; base free, apex acuminate, margin scarious, glabrous. Calyx 10-12-fid, the limbs 3.5-4.7 mm long at maturity. Corolla white to pink; that of the hermaphrodites 2.3-3.3 mm long, infundibular, the tube 1.5-2.0 mm long, 0.6-1.2 mm wide, glabrous without, scattered pilosulous within, the hairs 0.3-0.5 mm long, the lobes 0.9-1.6 mm long, 0.5-1.3 mm wide, spreading at anthesis, the apices rounded; corollas of female flowers 1.5-2.3 mm long, rotate, the tube 0.9-1.3 mm long, 0.6-1.0 mm wide, glabrous without, scattered pilosulous within, the lobes 0.6-1.3 mm long, 0.4-1.2 mm wide, the apices rounded, spreading at anthesis. Stamens exserted, 2.0-3.0 mm long; the filaments 1.8-2.6 mm long, adnate for 1/3-1/2 of the length of the tube; anthers 0.5-0.8 mm long. Style of hermaphrodites 2.8-3.0 mm long; that of females 2.2-2.9 mm long; stigmas 0.2-0.4 mm long. Cypsela purple-maculate, 1.7-2.5 mm long, 1.2-1.6 mm wide, ovate, adaxial vein simple, abaxial veins simple, the lateral veins parallel with the margin, the margin slightly reinforced, both surfaces uniformly pubescent or canescent, 0.3-0.4 mm long.

Phenology: Flowering Jul-Sep, fruiting Aug-Oct.

Distribution: Open pine-oak woodlands and disturbed sites in the southern half of the Valley of Mexico, 2400-2800 m. **Distrito Federal:** 4 km E de Ajusco, deleg. Tlalpan, *Aguirre Z. 38* (ENCB); Santa Fe, *Bourgeau 608* (BR, GH, L, MO, P); Contreras, *Goodman 3465* (F); Cerro Conejo, ENE de Ajusco, 23 Jul 1967, *López Guazo s. n.* (ENCB);

Cuajimalpa, *Lyonnet* 493 (GH, MEXU, MO, NY, US); Cerro Magdalena, Serranía de Ajusco, *Lyonnet* 1907 (MEXU, US); Lomas de Mixcoac, *Lyonnet* 2315 (US); Eslava, *Lyonnet* 3260 (US); Contreras, *Orcutt* 3642 (F); 4 km E de Ajusco, deleg. Tlalpan, *Padilla* 84 (DS, ENCB, MICH); Pedregal de San Ángel, *Paray* 303 (ENCB); Pedregal, *Pringle* 7315 (GH); Woods near Eslava, *Pringle* 9366 (GH, MO, NY, US), *Pringle* 11474 (AZ, BCAS, F, GH, L, MICH, US); km 45, autopista México-Cuernavaca, *Ramos M. & Hernández M.* 1240 (MEXU); Ajusco, *Rose et al.* 9260 (NY, US); Eslava, *Rusby* 148 (NY, US); Pedregal de San Ángel, *Rzedowski* 1290 (ENCB), *Rzedowski* 1827 (ENCB); ca. de Santa María Astahuacán, *Rzedowski* 30860 (ENCB); La Venta, *Scheifer* 129 (GH); Paraje de Cuauhte, delegación de Milpa Alta, *Ventura A.* 1735 (ENCB, MEXU); Cerro de San Miguel, delegación de Milpa Alta, *Ventura A.* 1817 (ENCB); San Bartolo Xicomulco; delegación de Milpa Alta, *Ventura A.* 1932 (ARIZ, ENCB, MEXU, WIS); Cerro de Esquehuil, delegación Xochimilco, *Ventura A.* 2917 (ENCB, MEXU). **Mexico:** Tlalmanalco, Cerro de Santa Cruz, *Altamirano* 5050 (MEXU); Mpio. Texcoco, Cerro Tetzcutzingo, *Barrie* 442 (MEXU, TEX); Mpio. Naucalpan, 2 km SE de San Francisco Chimalpa, 3 Sep 1967, *Castillo R. s. n.* (ENCB); région montagneuse des environs de Toluca, *Diguet s. n.* 2400 (MO); Mpio. Texcoco, 13 km SE de Texcoco, *García P.* 344 (ENCB, MEXU); Tequesquináhuac, Cerro de Azompan, *Matuda et al.* 31192 (MEXU, MO); Mpio. Tlalmanalco, St. Tomás Atzingo, *Pineda R.* 468 (MICH); Mpio. Tlalmanalco, 3 al SW de Tlalmanalco, *Pineda R.* 490 (ENCB, MICH); Mpio. Texcoco, Cerro Tetzcutzingo, *Pulido S.* 88 (CHAPA, ENCB); E del Cerro del Pino, ca. de Ayotla, *Rzedowski* 24016 (ENCB); Mpio. Naucalpan, 2 km S de San Francisco Chimalpa, *Rzedowski* 24318 (ENCB); Tepozotlán, 5 km al NW de Tepozotlán, *Rzedowski* 28295 (CAS, ENCB); Tepozotlán, parte alta de Sierra de Alcaparrosa, *Rzedowski* 31246 (ENCB); Ecatepec, 6 km W de San Cristóbal Ecatepec, *Rzedowski* 32195 (ENCB, MEXU); Texcoco, 5 km al E de Coatlinchán, *Rzedowski* 37457 (ENCB); Progreso Industrial, *San Juan León G.* 616 (ENCB); Valley of Mexico, 1855, *Sartorius s. n.* (US); Valley of Mexico, *Schaffner* 195 (MO); El Mirador, autopista México-Puebla, *Vela G.* 3159 (MEXU). **Puebla:** Puente del Emperador, near La Venta, *Sharp* 44360 (MEXU, MO).

Valeriana rzedowskiorum is most easily confused with *V. pilosiuscula* M. Martens & Galeotti, a species of the pine-oak forests south and west of the Valley of Mexico basin. The two species are most readily distinguished by the number of lateral leaflets, typically 6-10 in *V. pilosiuscula*, 1- 8 in *V. rzedowskiorum*, and by flower size. The corollas of perfect flowers are 3-5.4 mm long in *V. pilosiuscula* and 2.3-3.3 mm in *V. rzedowskiorum*, those of female flowers 2.1-3.1 mm and 1.5-2.3 mm, respectively. The fruits of *V. rzedowskiorum* tend to be slightly smaller, but in both species the fruits are uniformly pubescent to velutinous or canescent on both surfaces.

Valeriana rzedowskiorum is named for the noted botanists, Drs. Jerzy Rzedowski and Graciela Calderón de Rzedowski. Among their many achievements and contributions to Mexican botany are the editorship and principal authorship of the Flora Fanerogámica del Valle de México (Rzedowski and Rzedowski, 1979; 1985; 1990), the region to which this species is apparently endemic.

Valeriana chiapensis Barrie sp. nov. TYPE: Mexico. Chiapas: Mpio. Venustiano Carranza, 3 miles south of Aguacatenango along road to Pinola Las Rosas, 15 Jul 1966, *Breedlove* 14544 (holotype: ENCB; isotypes: DS, F, MICH). Fig. 6.

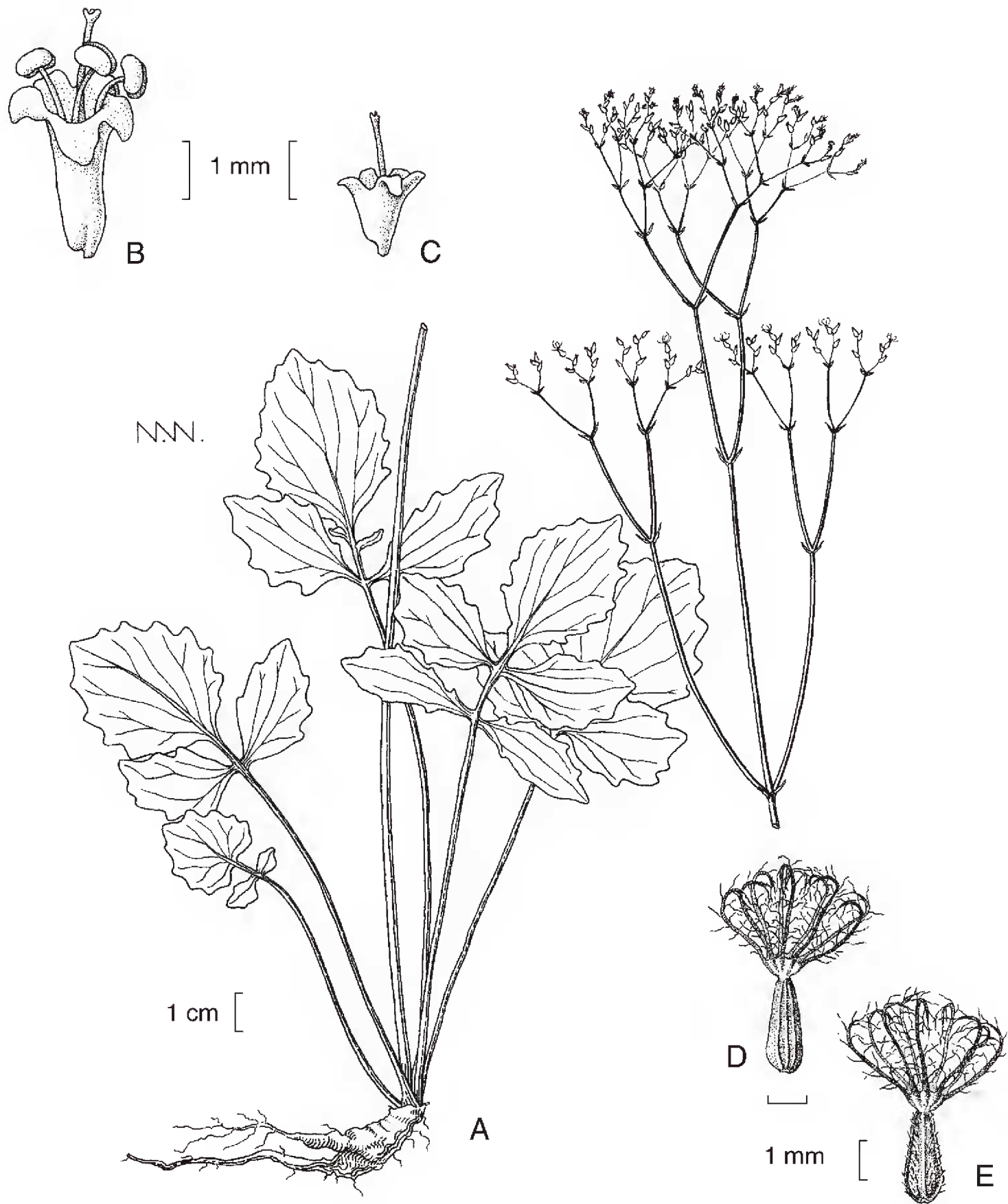


Fig. 6. *Valeriana chiapensis* Barrie. A. habit; B. hermaphroditic flower, the style elongated; C. female flower; D. fruit abaxial surface; E. fruit, adaxial surface. Drawn from type collection, *Breedlove 14544*.

Herba perennis gynodioica, ad 50-140 cm alta. Radix napiformis, 2.5-5.0 cm longa, simplex vel 2-3-lobis. Caulis saepissime 1, 25-80 cm longus. Folia basalia et caulina, imparipinnata, glabra vel pubescentia; folia basalia 6-30 cm longa, longe petiolata; laminae 1.3-9.5 cm longae, 1.5-9.0 cm latae, ovatae ad obovatae; foliola 3-7, ovata vel obovata, foliolium terminale saepe quam foliola lateralia majus. Inflorescentia paniculiformis, infructescentia demum 25-60 cm longa. Bractee lineares, 2-8 mm longae, 1 mm latae, basi discretae, apice acuminatae, ad marginem scariosae, glandulifero-ciliatae. Calyx 9-14-fidus, limbo plumoso, 3-5 mm longo in fructu. Corolla alba, infundibularis; corolla florum hermaphroditorum 3.4-4.9 mm longa, corolla florum femineorum 1.5-1.8 mm longa. Cypsela purpureo-maculata, 2.1-2.6 mm longa, 1.1-1.5 mm lata, ovata, saepe solum abaxialiter pubescens, raro utrinque pubescens vel glabra.

Erect, perennial, gynodioecious herbs, 50-140 cm tall. Roots simple or 2-3-lobed, the lobes 2.5-5.0 cm long, 1.0-3.0 cm wide, napiform. Stems green to purple, usually 1 per plant; 25-80 cm long, 2-6 mm wide; pubescent, the hairs 0.3-1.0 mm long, vestiture sometimes restricted to the leaf nodes. Leaves basal and cauline; imparipinnate or with 1-3 reduced, simple basal leaves; the pinnate basal leaves 6-30 cm long; long-petiolate, the petioles 4-21 cm long, 2-3 mm wide; pubescent, the hairs 0.4-0.8 mm long, or glabrous; blade 1.3-9.5 cm long, 1.5-9.0 cm wide, obovate to ovate or widely ovate; the upper surface glabrous or uniformly pubescent, vestiture restricted to the veins below, the hairs 0.5-1.0 mm long; the terminal leaflet larger than the laterals, 17-75 mm long, 15-45 mm wide, obovate to ovate or widely ovate, base truncate or cuneate, apex acute, margins irregularly dentate; lateral leaflets in 1-3 opposite or subequal pairs, generally increasing in size distally, 7-50 mm long, 3-23 mm wide, ovate, base decurrent, apex acute, margins irregularly dentate. Cauline leaves in 2-4 pairs, 3.0-17.5 cm long; the petioles 0.8-6.5 cm long, 1-5 mm wide, base connate, glabrous or pubescent, the hairs 0.5-1.0 mm long; blade 2.2-11.0 cm long, 1.5-9.5 cm wide, obovate to deltate; pubescent, the hairs 0.5-1.0 mm long, the vestiture often restricted to the leaflet axils, or to the veins abaxially; the terminal leaflet usually larger than the laterals, but sometimes approached in size by the upper-most pair of lateral leaflets, 10-65 mm long, 5-30 mm wide, elliptic to widely ovate, base cuneate, apex acute, margins irregularly dentate; lateral leaflets in 1-3 opposite pairs, increasing in size distally, 6-65 mm long, 3-20 mm wide, ovate to obovate, base cuneate or decurrent, apex acute, margins irregularly dentate. Inflorescence paniculoid, 6-20 cm long in bud and early flower, 25-60 cm long in fruit; the branches in 2-5 pairs, 4-24 cm long; the terminal branchlets scorpioid, bearing up to 9 flowers or fruits; pubescent, usually at the nodes only, the hairs 0.3-0.7 mm long, or glabrous. Bracts 2-8 mm long, 1 mm wide, linear, base free, apex acute, margins scarious, glabrous or pubescent at the base, the hairs 0.3-0.8 mm long. Bractlets equal to or shorter than the mature fruits, 1.8-2.7 mm long, 0.6-1.0 mm wide, lanceolate, base free, apex acuminate, margins scarious, glandular-ciliate. Calyx 9-14-fid, 3.0-5.0 mm long at maturity. Corollas white, infundibular, gibbous, glabrous within and without; corollas of hermaphrodites 3.4-4.9 mm long, the tube 2.5-3.5 mm long, 0.7-1.2 mm wide, the lobes 0.7-1.4 mm long, 0.5-1.0 mm wide, spreading at anthesis, apices rounded; corollas of females 1.5-1.8 mm long, the tube 1.2-1.4 mm long, 0.4-0.8 mm wide, the lobes 0.3-0.5 mm long, 0.3-0.4 mm wide, spreading at anthesis, apices rounded. Stamens weakly exerted, 1.7-2.2 mm long; the filaments 1.5-1.8 mm long, adnate for 3/4 of the length of the tube; anthers 0.5-0.8 mm long. Style 3.5-4.1 mm

long in hermaphrodites; 2.3-2.9 mm long in females; stigmas 0.1-0.2 mm long. Cypselas purple-maculate, 2.1-2.6 mm long, 1.1-1.5 mm wide, ovate, veins simple, lateral veins parallel with the midvein, most commonly pubescent on the abaxial surface only, the hairs 0.2-0.4 mm long, occasionally pubescent on both surfaces or glabrous. Chromosome number unknown.

Phenology: Flowering Jun-Oct, fruiting Jul-Oct.

Distribution: Pine-oak forests in central Chiapas, on the western slope of the Central Plateau, 1700-2400 m.

Additional specimens examined. **Chiapas:** Cerro San Cristobal, San Cristobal de las Casas, *Breedlove 5991* (DS, ENCB, F, MICH); Lourdes Piedrecitas, *Breedlove 6731* (DS, ENCB, F); W of Tenejapa Center along trail to Paraiso, *Breedlove 6850* (F, MICH); Tenejapa, slope along river of Chik Ho', barrio of Yashanal, *Breedlove 11099* (DS, ENCB, F, MICH); near summit of Chuchil Tom, near Bochil, *Breedlove 26052* (DS); on road to San Lucas Zapotal, 2-4 km from Hwy 190, *Breedlove 37270* (DS, MEXU); Comitán de Domínguez, 5 km N of Hwy 190 on road to Laguna Chamela microwave tower, *Breedlove 40788* (DS); San Cristobal de las Casas, Sierra de Salsipuedes, *Breedlove 40683* (DS, MEXU, MO); without locality, *Ghiesbrecht 623pp* (BM, GH, MO); 14 mi. W of San Cristobal on Hwy 190, *Kral 25341* (ENCB, MO); Cerro San Cristobal, in San Cristobal de las Casas, *Laughlin 1052* (DS, ENCB), *Laughlin 1489* (DS); Zinacantan, Kampana Ch'en, 3 mi W of paraje Navenchank, Hwy 190, *Laughlin 1261* (DS).

Valeriana chiapensis is similar in appearance to *V. pilosiuscula*, from which it may be differentiated by the smaller basal leaves with 1-3, as opposed to 6-10, pairs of lateral leaflets, the longer, more gracile inflorescence branches, the bractlets equal to or shorter than the mature fruits, the smaller female flowers, the shorter, less strongly exerted anthers, and fruits which are most commonly pubescent on the adaxial surface only. If the fruits are uniformly pubescent, the hairs are neither as dense nor as long as those of *V. pilosiuscula* or *V. rzedowskiorum*.

Valeriana tzotzilana Barrie, sp. nov. TYPE: Mexico. Chiapas: Large pasture at the southeast city limits of Teopisca, Mpio. Teopisca, 23 Jul 1965, *Breedlove 11782* (holotype: ENCB; isotypes: DS, LL, MICH, NY, WIS). Fig. 7

Herba biennis gynodioecia ad 16-65 cm alta. Radix 1-3 cm longa lataque, globosa vel clavata. Caulis 15-50 cm longus, 1-2 mm latus, glabratus. Folia caulina, 7-12 cm longa, simplicia vel composita cum 1-2 paribus foliolorum lateralium redactorum; laminae foliorum simplices et foliola terminalia foliorum compositum 18-50 mm longae, 12-36 mm latae, ellipticae vel ovatae, glabratae. Inflorescentia corymbosa, 10-30 cm longa, fructus in fasciculis terminalibus remotis. Bracteae 4-11 mm longae, 0.6-1.5 mm latae, lineares ad lanceolatae, ad basin discretae vel connatae, apice integrae, bifidae vel trifidae, ad marginem scariosae, glabrae vel glandulifero-ciliatae. Bracteolae fructum superantes, 2.6-3.7 mm longae, 0.5-0.7 mm latae, lineares vel lanceolatae, ad basin discretae vel connatae, apice acutae, ad marginem scariosae, glabrae vel glandulifero-ciliatae. Calyx

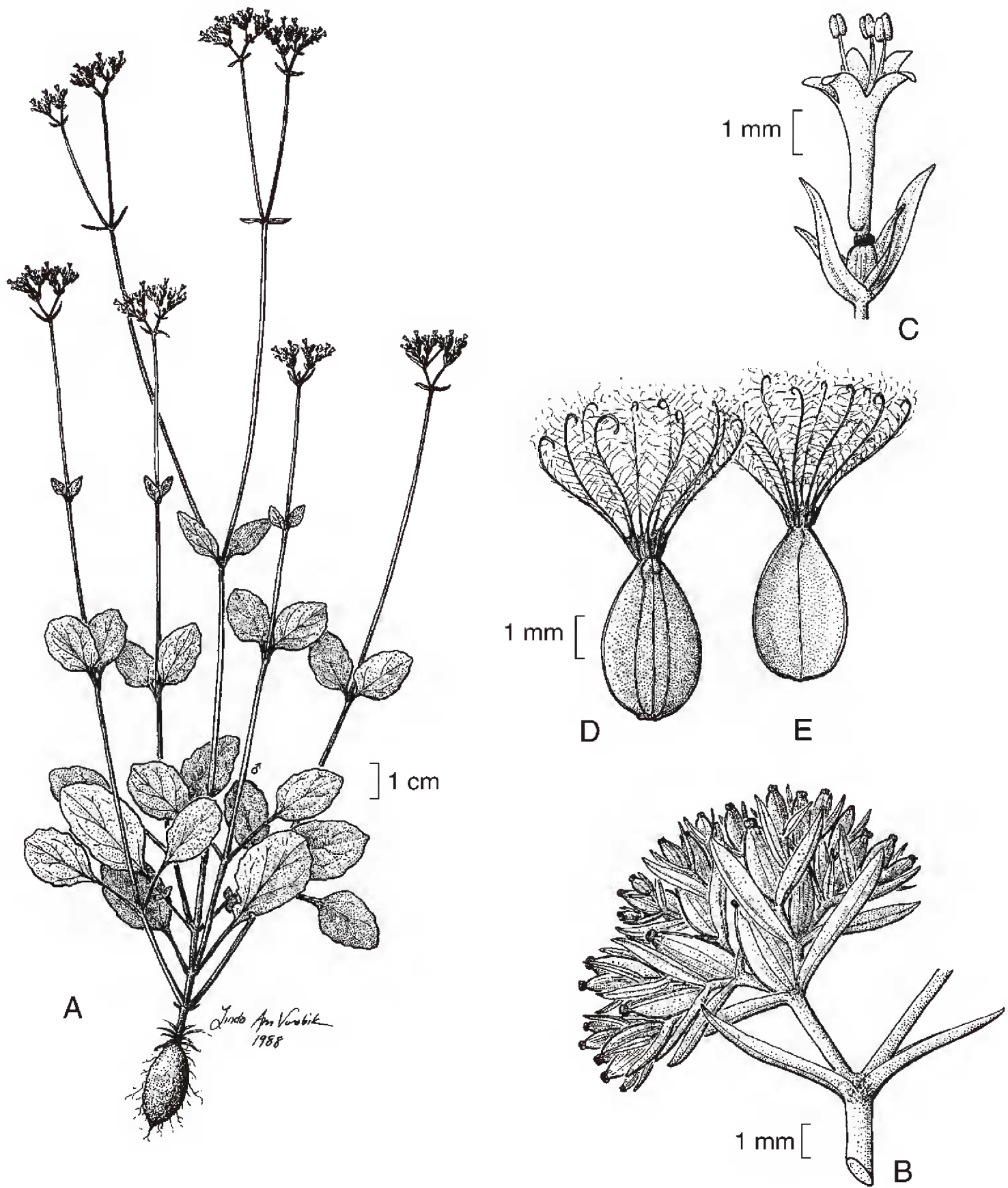


Fig. 7. *Valeriana tzotzilana* Barrie. A. habit; B. terminal branchlet with maturing fruits; C. hermaphroditic flower, male phase; D. fruit, abaxial surface; E. fruit, adaxial surface. Drawn from Holotype, *Breedlove 14789* (ENCB).

11-15-fidus, limbi plumosi, 2.0-3.5 mm longi in fructu. Corolla alba, infundibularis, corolla florum hermaphroditorum 4.0-6.0 mm longa, corolla florum femineorum 1.0-2.7 mm longa. Stamina et stylus exserti. Cypsela fulva vel purpureo-maculata, 2.6-3.6 mm longa, 2.0-2.6 mm lata, ovata vel elliptica, glabra.

Erect, biennial, gynodioecious herbs, 16-65 cm tall. Root 1-3 cm long, 1-3 cm wide, globose or clavate. Stem green, often purplish along the lower half; 15-50 cm tall, 1.0-2.0 mm wide, terete, glabrous. Leaves cauline, simple or compound with 1-2 subequal pairs of reduced, lateral leaflets, both leaf types often present on the same plant, 23-120 mm long, 12-36 mm wide; glabrous; petioles 4-65 mm long, 1-2 mm wide, connate; blades of simple leaves 18-50 mm long, 12-36 mm wide, elliptical to ovate, base narrowly to broadly cuneate, apex rounded to acute, margin crenulate or entire; terminal leaflet of compound leaves comparable to the blade of the simple leaf, lateral leaflets 4-11 mm long, 2-9 mm broad, round to oval, base decurrent along the petiole, apex acute, margins entire to crenulate. Inflorescence corymboid, the branching acrotonic, capitate in early flower, expanding to 10-30 cm long in fruit, the fruits borne in remote terminal clusters. Bracts green, often purple distally, 4-11 mm long, 0.6-1.5 mm broad, linear to lanceolate, base free or connate, apex entire and acute to bifid or trifid, margin scarious, glabrous or glandular-ciliate, papillose or pubescent at base, surfaces glabrous. Bractlets green, often purple distally, longer than mature fruits, 2.6-3.7 mm long, 0.5-0.7 mm broad, linear to lanceolate, base free or connate, apex acute, margin scarious, glabrous or glandular-ciliate, pubescent basally. Calyx 11-15-fid, 2.0-3.5 mm long at maturity. Corolla infundibular, gibbous, glabrous without, pilose within; corollas of hermaphrodite flowers 4.0-6.0 mm long, the tube 3.0-4.5 mm long, 0.9-1.7 mm wide, the lobes 0.9-1.5 mm long, 0.9-1.1 mm wide, rounded, spreading at anthesis; corollas of female flowers 1.0-1.6 mm, the tube 0.8-2.0 mm long, 0.5-0.7 mm wide, the lobes 0.5-0.9 mm long, 0.5-0.9 mm broad, rounded, spreading at anthesis. Stamens exserted, 3.4-5.2 mm long; the filaments 3.0-4.5 mm long, adnate for 1/2-2/3 of the length of the tube; anthers 0.9-1.4 mm long. Style of hermaphrodites 4.5-6.5 mm long; that of females 3.5-4.0 mm long; stigmas 0.1-0.2 mm long. Cypsela tan or purple-maculate, 2.6-3.6 mm long, 2.0-2.6 mm broad, ovate to elliptical, the veins simple, the lateral veins parallel to the midvein, glabrous.

Phenology: Flowering and fruiting Jun-Aug.

Distribution: Grassland and pastures along the western edge of the Chiapas Plateau between San Cristobal de las Casas and Teopisca. 1800-2200 m.

Additional specimens examined. **Chiapas**: grassy bank along reservoir of Rancho Nuevo, 9 mi SW of San Cristobal de las Casas on highway 190, *Breedlove 10429* (CAS, F); near reservoir of Rancho Nuevo, 9 mi SE of San Cristobal de las Casas along Hwy. 190, *Breedlove 14789* (ENCB, F, MEXU, MICH, NY, WIS); Chiapas, etc., 1864-70, *Ghiesbrecht 622* (GH, K, MO); 1788-1801, *Sessé & Mociño s. n.* (MO).

Valeriana tzotzilana is distinguished from other species of the genus by the long-petiolate leaves that often have 1-2 pairs of very reduced lateral leaflets and the following combination of characters: a corymboid inflorescence, elliptic, glabrous cypselas and

linear bractlets that are longer than the mature fruit. The long bractlets are similar to the bractlets found in *V. deltoidea*, a species endemic to Durango and Chihuahua. *Valeriana deltoidea*, however, has pinnately compound leaves with 2-4 pairs of well-developed lateral leaflets. All of the Breedlove collections cited above have been identified as *V. deltoidea*, and *Breedlove 10449* and *14789* were cited as such in the Flora of Guatemala (Nash 1976).

This species is named for the Tzotzil, the native people of the region in which it is endemic.

Valeriana oaxacana Barrie, nom. nov. *Valeriana affinis* M. Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 111:123. 1844, non *Valeriana affinis* Opiz, 1825. *Valeriana densiflora* var. *affinis* F. G. Meyer, Ann. Missouri Bot. Gard. 38:457. 1951. TYPE: Mexico. Oaxaca: Cerro San Felipe, near Oaxaca, 1837-1838, *Galeotti 2555* (lectotype, here designated: BR; isolectotypes: BR, G, K, MO, P, W).

Erect, perennial, dioecious herbs, 30-100 cm tall. Root simple or with 2-5 lobes, 5-10 cm long, 3-10 mm wide, the lobes cylindrical to clavate. Stems usually 1, less commonly 2-3, arising from a simple caudex; 5-48 cm long, 2-6 mm wide; pubescent, the hairs 1.0-1.5 mm long. Leaves basal and cauline, imparipinnate, 7-27 cm long; petioles 1-14 cm long, 3-6 mm wide; the base of basal leaves imbricate, that of cauline leaves free, margin ciliate, the hairs 0.9-1.5 mm long; blade 3.5-15.0 cm long, 3.0-6.2 cm wide, oblanceolate to obovate, pubescent along rachis adaxially, the hairs 0.3-0.5 mm long, and tufted-ciliate in the leaflet axils, the hairs 0.5-1.0 mm long; terminal leaflet larger than the laterals, 16-40 mm long, 6-34 mm wide, ovate or widely ovate to obovate or widely obovate, base cuneate, apex acute, margins irregularly lobed or dentate; lateral leaflets in 3-6 opposite to subequal pairs, increasing in size distally; 7-32 mm long, 3-20 mm wide; ovate to obovate, base cuneate, apex acute, margins irregularly lobed or dentate. Inflorescence paniculoid, in early flower the inflorescence of male plants elongates, 30-40 cm long, the branches in 4-5 pairs, ascending, the lower branches 22-30 cm long, the upper branches 2-10 cm long, the buds and flowers in clusters, 1-4 cm long, 1-3 cm wide, at the tips of the branches, the clusters expanding in late flower; the inflorescence of female plants more compact in early flower, 3-5 cm long, 2-3 cm wide, expanding to 40-75 cm long in fruit, the branches in 3-7 pairs, 5-27 cm long, terminal branching scorpioid, bearing 2-5 fruits; both types pubescent, densely so at the nodes, the hairs 0.5-1.5 mm long. Bracts 3-15 mm long, 1-2 mm wide, linear, base free, apex acute, margins entire, glabrous or glandular-ciliate. Bractlets equal to or shorter than the mature fruits, 1.6-2.4 mm long, 0.4-0.7 mm wide, lanceolate, base free or connate, apex acute, margins scarious, glabrous or ciliate, if only at the base. Calyx 10-14-fid, 3.5-5.1 mm long on mature fruits. Corolla pink to white, infundibular, gibbous, glabrous within and without; that of males 2.5-4.2 mm long, the tube 1.6-2.8 mm long, 0.6-1.0 mm wide, the lobes 0.9-1.4 mm long, 0.6-1.0 mm wide, spreading at anthesis, apices acute or rounded; corolla of females 1.4-2.0 mm long, the tube 1.0-1.5 mm long, 0.7-0.8 mm wide, the lobes 0.3-0.5 mm long, 0.3-0.5 mm wide, ascending at anthesis, apices rounded. Stamens weakly exerted, 1.3-2.2 mm long; the filaments 1.1-1.8 mm long, adnate for 2/3 of the length of the tube; anthers 0.5-0.9 mm long. Style 1.5-2.0 mm long; stigmas 0.1-0.2 mm long. Cypsela tan to purple-

maculate, 2.0-2.6 mm long, 1.4-1.6 mm wide, ovate, veins simple, abaxial lateral veins parallel to the midvein, surfaces glabrous. Chromosome number unknown.

Phenology: Flowering Jun-Aug, fruiting Jul-Sep.

Distribution: Pine-oak forests of the Sierra de San Felipe, northeast of Ciudad Oaxaca, east to Cerro Zempoaltepec, 2500-3000 m.

Additional specimens examined. **Oaxaca:** San Juan Atepec, 0.5 km E of Hwy 175, 20 km N of Ixtlan, *Barrie & Leidig 1087* (MEXU, TEX); 1.8 km S of summit at La Cumbre, 24 km N of Oaxaca, *Cochrane 8525* (WIS); 12 km N of Ixtlan on road to Valle Nacional, *King 2068* (MICH); NW side of Mt. Zempoaltepec, *Nelson 644* (US); near Cerro San Felipe, *Nelson 1110* (GH, US); Sierra San Felipe, ca. 10 mi. N of Oaxaca, *Pringle 4707* (BM, BR, E, F, GH, MEXU, MICH, MO, NY, UC, US, W); Cerro de San Felipe, *Smith 766* (F, MO, NY, UC, US), *Smith 892* (F, MO, US); 4 km W of La Cumbre on logging road, *Tillet 637107* (US); ridge near road to Ixtlan, 7-7.5 mi N of Oaxaca, *Webster et al. 11497* (MEXU).

Valeriana oaxacana is distinguished by its dioecious habit, diffuse inflorescence and glabrous corollas and fruits. Within its range there are two species, *V. pulchella* and *V. barbareaifolia*, with which it might be confused. The characters which most obviously separate it from *V. pulchella* are the dioecious habit, the more diffuse infructescence, the smaller, glabrous, corollas and the plumose calyx. It differs from *V. barbareaifolia* in being perennial and dioecious rather than biennial and gynodioecious, in the presence of basal leaves, and in having glabrous rather than adaxially pubescent fruits.

Meyer (1951) considered this a variety of *Valeriana densiflora*, but *V. oaxacana* differs from that species in its dioecious habit, the basal leaves with 3-6, not 1-3, pairs of lateral leaflets, its smaller, glabrous, corollas and glabrous fruits.

Valeriana urticifolia Kunth, in H.B.K., Nov. gen. sp. 3:330. 1819. TYPE: Colombia; prope Almaguer, 1801-1802, *Humboldt & Bonpland 3330* (holotype: P; phototypes: GH!, MO!, P!, IDC microfiche 6209.82:III.1!).

Erect, biennial, gynodioecious herbs, 15-120 cm tall. Root simple, 1-3 cm long, 1-3 cm wide, globose. Stems 1, rarely 2-3, green to maroon; 8-57 cm long, 1-4 mm wide, terete or weakly alate, glabrous or retrorse-pubescent, the hairs 0.2-0.5 mm long. Leaves cauline, 2-8 pairs; the lowermost pairs petiolate, the petioles decreasing in length from the lowest leaf-pair to the uppermost, the uppermost pairs often sessile or amplexicaul, the petioles 1-15 (28) mm long, 1-3 mm wide; sometimes carinate, the keel decurrent down the stem; base free or connate; margins ciliate; surfaces pubescent, the hairs 0.2-0.6 mm long; blades 10-55 mm long, 5-50 mm wide, ovate to broadly ovate, reniform, rhombic, triangular or deltate; base cuneate, truncate or cordate; apex acute or rounded; margin sinuate to dentate or serrate, ciliate, the hairs 0.2-0.4 mm long; the upper surface glabrous or with scattered hairs, the lower surface glabrous or pubescent along the veins, the hairs 0.2-0.4 mm long. Inflorescence corymbose or paniculoid, 5-25 cm long in bud and early flower, 20-65 cm long in late flower or fruit; if paniculoid, with 2-7 branch-pairs, the branches 2-15 cm long, the terminal branchlets scorpioid, bearing 6-20 (35) flowers or

fruits; glabrous or retrorse-pubescent, often at the nodes only, the hairs 0.2-0.6 mm long. Bracts 2-9 mm long, 0.5-2.0 mm wide, linear or lanceolate to oblanceolate, base free or connate, apex acute or acuminate, margin scarious, glabrous or ciliate, the hairs 0.2-0.3 mm long. Bractlets 3/4 to nearly equal the length of the fruit, 1.2-2.0 mm long, 0.3-1.2 mm wide, lanceolate or ovate, base free or connate, apex acuminate to apiculate, margin scarious, glabrous or glandular-ciliate. Calyx 8-12-fid, the limbs plumose, 2.0-5.0 mm long in fruit. Corolla white to pink or lavender, salverform, gibbous, glabrous without, pilose within, the hairs 0.2-0.4 mm long; corollas of hermaphrodites 2.8-6.7 mm long, the tube 1.5-5.2 mm long, 0.3-0.7 mm wide, the lobes 0.9-2.3 mm wide, spreading at anthesis, the apices rounded; corollas of females 1.7-3.4 mm long, the tube 1.0-2.5 mm long, 0.3-0.5 mm wide, the lobes 0.7-1.4 mm long, 0.5-0.9 mm wide, the apices rounded, spreading at anthesis. Stamens exserted, 1.7-3.6 mm long; the filaments 1.4-3.2 mm long, attached 2/3-9/10 above the base of the tube; the anthers 0.5-0.9 mm long. Style 2.5-7.2 mm long in hermaphrodites; 1.8-4.5 mm, long in females; stigmas 0.3-0.6 mm long. Cypsela tan or purple-maculate, 1.3-2.6 mm long, 1.0-1.6 mm wide, ovate, the adaxial vein slightly raised, the abaxial midvein simple or slightly raised, the lateral veins either simple and midway between the midvein and the margin and parallel with the margin, or at the margin and reinforced, giving the fruit a doubly-reinforced margin which is thicker than the body of the fruit, surfaces smooth or granular, pubescent on the adaxial surface only, the hairs 0.2-0.5 mm long.

A widespread species distinguished from other biennial valerians, with the exception of *V. selerorum*, by the simple dentate leaves. *Valeriana selerorum* differs in its rhombic or trullate fruits and inflorescence which is always paniculoid. The two differ in leaf venation as well; the veins of *V. urticifolia* are straight, while those of *V. selerorum* tend to be more arcuate. The range of *V. selerorum* is relatively small, northeastern Michoacan and southwestern Mexico, and within the range of *V. urticifolia* var. *scorpioides* and it is not uncommon to find the two growing together. Where they do, *V. urticifolia* has lavender flowers, which set it off from the white or pale pink flowered *V. selerorum*.

The two varieties of *V. urticifolia* are recognized here may be separated by fruit characters alone.

***Valeriana urticifolia* Kunth var. *urticifolia*.**

Valeriana erysimoides Poeppig, in Poepp. & Endl., Nov. gen. sp. pl. 3:16. 1840.
TYPE: Peru. Cuchero, 1830, *Poeppig 1670* (holotype: W; isotype: F!).

Leaves ovate to widely ovate, reniform or triangular. Inflorescence paniculoid. Corollas white or pale pink; corollas of hermaphrodites 2.8-6.7 mm long, the tube 1.5-5.2 mm long, 0.3-0.7 mm wide, the lobes 0.9-2.2 mm long, 0.3-0.6 mm wide; corollas of females 2.2-3.4 mm long, the tube 1.1-2.5 mm long, 0.3-0.5 mm wide, the lobes 0.7-1.4 mm long, 0.5-0.9 mm wide. Cypsela tan or purple maculate, 1.6-2.2 mm long, 1.0-1.5 mm wide, the midveins slightly reinforced, the abaxial lateral veins reinforced at the margins, producing a margin thicker than the body of the fruit. Chromosome number $n = 16$ (*Barrie 1041*, TEX).

Phenology: South America: flowering and fruiting year-round. Panama to Honduras: flowering and fruiting Jun-Feb. Guatemala and Mexico: flowering and fruiting Jul-Jan.

Distribution: Peru, Ecuador and Colombia north to the Sierra Madre del Sur and Pico de Orizaba in Veracruz, Mexico and along the Pacific slope of the Sierra Madre Occidental to Sinaloa. In Mexico, it is weedy; common in disturbed sites in the pine-oak zone.

Representative specimens. **Chiapas:** Mpio. Ixtapa along Hwy 190, paraje of Muctanoc, *Breedlove 11858* (CAS, F, LL, MICH); Mpio. Jitotol, 5 mi S of Jitotol, *Breedlove 11962* (LL, NY); Mpio. Tenejapa, paraje of Matsab, *Breedlove 12466* (CAS, WIS); Mpio. La Trinitaria, 17 mi E of La Trinitaria, *Breedlove 13025* (CAS, NY); Mpio. San Cristobal de las Casas, 9 mi S of San Cristobal de las Casas, *Breedlove 14940* (CAS, F, LL, MICH, NY, US, WIS); Mpio. Teopisca, S city limits of Teopisca, *Breedlove 15027* (CAS, F, WIS); Mpio. Cintalapa, 19 km NW of Las Cruces on road to La Cienega, *Breedlove 28480* (CAS, CHAPA, ENCB, LL, MEXU, MO); Mpio. Pueblo Nuevo Solistahuacan, 3 km NW of Pueblo Nuevo Solistahuacan, *Breedlove 29953* (CAS, MEXU, MICH, MO); Mpio. Angel Albino Corzo, 3-5 km above Jaltenango along road to Finca Prusia, *Breedlove 38556* (CAS, MEXU, MO); Mpio. Bochil, 8 mi N of Bochil, *Clarke 158* (CAS); Mt. Ovando, *Matuda 2187* (MICH); Mt. Tacaná, *Matuda 2491* (ARIZ, F, GH, LL, MICH, MO, NY, UC); Barranca Honda, Siltepec, *Matuda 4106* (GH, MICH, NY); Hacienda Monserrate, *Purpus 9165* (GH, MO, NY, UC, US); Mpio. Amatenango del Valle, Amatenango del Valle, *Shilom Ton 1503* (CAS, ENCB, LL, WIS). **Guerrero:** Distr. Mina, Chiriagua, *Hinton 9846* (F, GH, LL, MICH, MO, NY, UC, US, W); Vallecitos, *Hinton 11335* (GH, LL, MICH, NY, UC); Distr. Galeana, Plan del Carrizo, *Hinton 14664* (ARIZ, ENCB, F, GH, LL, MO, NY, US); Le Faison, *Langlassé 335* (GH, US); Sierra Madre, *Langlassé 571* (GH, US); NE of Chilpancingo on road to Chilapa, *Moore & Wood 46589* (GH, MEXU, MICH, MO); 54 mi N of Acapulco, *Powell & Edmondson 779* (LL, MICH); Chichihualco, 24 km SW Filo de Caballo, al Puerto del Gallo, *Soto et al. 5781* (XAL). **Jalisco:** Mpio. Autlan, 9-10 mi S of Autlan on Hwy 80, *Anderson & Laskowski 3739* (GH, MICH, NY, US); Mpio. Tapalpa, Las Piedrotas, terracería a Chiquitlán, *Carvajal H. 12* (ENCB); Mpio. El Tuito, 10.1 km S of Las Juntas on Hwy 200, *Cowan 5632* (TEX); a 20 km E de Pto. Vallarta, *Delgado et al. 170* (MEXU); betw. Zarza Mora & Las Joyas, 15 km SSW of El Chante, *Iltis et al. 1347* (WIS); Mpio. Talpa de Allende, Sierra de Cuale, SW of Talpa de Allende, *McVaugh 14629* (MICH); Mpio. Tecalitlán, Llano Verde, ca. de Los Corales, *Rzedowski 17470* (ENCB, MEXU, MICH, TEX); Mpio. Tamazula, ca. Agua Hedionda, ca. 45 km al E de Aserradero, *Rzedowski & McVaugh 1083* (MICH, NY); La Huerta, Cerro Huehuentón, 20-25 km al E de Chamela, *Rzedowski & McVaugh 1391* (MICH); 10 km E of La Calera on Hwy 80, *Swagel 121* (MICH, TEX). **Mexico:** Mpio. Temascaltepec, 7.4 mi S of Temascaltepec on rd to Tejupilco, *Anderson & Anderson 5018* (MICH, NY); Distr. Temascaltepec, Cucha, *Hinton 1677* (GH, LL, MO, NY, US). **Michoacan:** Mpio. Aguililla, 22.5 km W of Aguililla on road to Dos Aguas, *Barrie 586* (TEX); Coalcoman, 20 km W of Dos Aguas on road to Coalcoman, *Barrie 610* (TEX); Mpio. Coalcoman, 19.5 km SW of Coalcoman on road to Coahuayana, *Cowan et al. 5670* (TEX); Mpio. Ario de Rosales, 16.2 km NE of Los Sabinos road to Ario de Rosales, *Cowan et al. 5718* (TEX); Distr. Coalcomán, Puerto Zarzamora, *Hinton 15040* (ARIZ, GH, LL, NY, TEX, US, W); Distr. Uruapan, Tancítaro, *Hinton 15550* (ARIZ, ENCB, F, GH, LL, MICH, MO, NY, TEX, US); ca. de Sembrillas, 28 km al SW de Arteaga, *Rzedowski 26633* (ENCB); 10 km S of Hwy 15 on road to Huetamo, *Straw & Gregory 1197* (GH, MEXU, MICH). **Nayarit:** Mpio. Tepic, near Jalisco, *Ferris 8019* (US); road from Tepic to Jalcocotan, *Mexia*

602 (CAS, DS, GH, MICH, MO, NY, UC, US); Mpio. Tepic, 35 km SE de Tepic, sobre la carr. a Guadalajara, *Rzedowski 14287* (ENCB). **Oaxaca:** Mpio. Ixtlan de Juarez, Vivero Rancho Teja, 2 km E of Ixtlan de Juarez, *Hill 1789* (NY); mountains above Cuicatlan, *Pringle 5630* (F, GH); foothills near Oaxaca, *Pringle 5630a* (US); 4 km SW de San Miguel Suchixtepec, *Rzedowski 21094* (ARIZ, CAS, ENCB); Mpio. Teotitlán, 16.3 km NW Huautla de Jiménez, *Torres C. & Cedillo T. 1483* (ENCB, MEXU); Mpio. Pochutla, San José del Pacífico, *Ulloa & Hernández 206* (MEXU), *Ulloa & Hernández 240* (MEXU). **Sinaloa:** La Concordia, Hwy 40, 6-8 km E of El Palmito, *Breedlove 43895* (CAS, MEXU); 60 km E of Villa Union, *Detling 8545* (US); Mpio. Rosario, Priachas, *González O. 7153* (BR, CAS, F); 18.4 mi SW of El Paraiso on Hwy 40, *Ownbey & Ownbey 1902* (ARIZ, GH, MO, NY, TEX, UC). **Veracruz:** Mpio. Maltrata, Cumbres de Maltrata, *Hernández M. & Trigós 1275* (F, MEXU, MO, XAL); Mpio. Jilotepec, Esquilón, *Ventura A. 4246* (CAS, ENCB, MICH, TEX, WIS).

Variety *urticifolia* is most obviously typified by the fruits. Corolla color may also be a useful distinguishing character, being white or nearly so in this variety and lavender in var. *scorpioides*, though white corollas occur in some populations of it as well.

In southern Mexico, this species can be quite common locally and a major component of the roadside flora. Species with which it grows include the other widespread, weedy species; *V. palmeri*, *V. robertianifolia* and *V. sorbifolia*.

Valeriana urticifolia var. **scorpioides** (DC.) Barrie comb. et stat. nov. *Valeriana scorpioides* DC., Prodr. 4: 635. 1830. TYPE: Mexico. Mexico: Valley of Toluca, Dec 1827, *Berlandier 1133* (holotype: G-DC; isotypes: BM, G, MO).

Valeriana rhomboidea Greene, Pittonia 1:154. 1888. *Valeriana sallei* Briquet, Annuaire Conserv. Jard. Bot. Genève 17:339. 1914.

Leaves ovate, rhombic, triangular or deltate. Inflorescence paniculoid or, in some small individuals, corymbose. Corollas lavender, less commonly white or pink; corollas of hermaphrodites 3.0-6.4 mm long, the tube 1.9-4.1 mm long, 0.4-0.8 mm wide, the lobes 1.0-2.3 mm long, 0.6-1.4 mm wide; corollas of females 1.7-2.9 mm long, the tube 1.0-1.9 mm long, 0.7-1.0 mm wide, the lobes 0.7-1.0 mm long, 0.5-0.7 mm wide. Cypsela tan or purple-maculate, 1.3-2.6 mm long, 1.1-1.6 mm wide, the midveins simple, the abaxial lateral veins simple, often only the distal portion present, margins simple or slightly thickened, granular. Chromosome number, $2n = 64$ (Engel, 1976).

Phenology: Flowering and fruiting Aug-Dec.

Distribution: The Sierra Madre Occidental from southern Chihuahua to Jalisco, across the Sierra Volcanica Transversal to the Orizaba region of Veracruz. Two collections known from Guatemala. As with var. *urticifolia*, this is a weedy species of the pine-oak zone.

Representative specimens. **Chihuahua:** La Rocha, along tributary of Rio del Soldado, *Correll & Gentry 23114* (ENCB, LL, NY); Sierra Madre, 65 mi E of Batopilillas, *Goldman 187* (GH, NY, US). **Distrito Federal:** Eslava, *Lyonnet 357* (GH, MEXU, MO, NY, US); Volcán Xitle, *Matuda 19595* (MEXU, MO); Serrania de Ajusco, *Pringle 11478* (ARIZ, CAS, F, GH, LL, MICH, MO, TEX, US, VT, WIS); parte occidental del Pedregal, *Rzedowski*

1824 (ENCB); Xicalco, sobre la carretera México-Cuernavaca, *Rzedowski 23204* (CAS, ENCB, WIS); Tochuca, deleg. Xochimilco, *Ventura A. 2040* (ENCB, MEXU); Los Dinamos, deleg. Contreras, *Ventura A. 3508* (ARIZ, CHAPA, ENCB, MEXU, MICH, XAL). **Durango:** Mpio. San Juan de Michis, Reserva La Michilía, 80 km SE of Cd. Durango, *Carrillo S. 53* (MEXU); Mpio. Mezquital, 3 km W of Sta María de Ocotán, *González E. 1433* (TEX); Mpio. El Salto, 29 mi WSW of El Salto, *Maysilles 7578* (MICH, MO); Mpio. El Salto, Coyotes Hacienda, *Maysilles 7726* (MEXU, MO); Mpio. Durango, El Salto, Coyotes Hacienda, *Maysilles 7481A* (MICH); Mpio. Durango, 34 mi W of Cd. Durango on road to El Salto, *Maysilles 7529B* (MICH). **Guanajuato:** Mpio. Salvatierra, Cerro de los Lobos, *Flores 58* (CAS, ENCB, F, MEXU, XAL). **Hidalgo:** Mpio. Mineral del Monte, Real del Monte, *Clokey 1847* (MO); Mpio. Agua Blanca, 5 Sep 1970, *Gimate L. s. n.* (ENCB); Mpio. Acaxochitlán, 6 km E of Acaxochitlán, *Hernández M. 4935* (MEXU); by Rio Panotlan, between Zacualtipan & Olotla, *Moore 5319* (NY, US). **Jalisco:** Mpio. Cuautla, 11 km W of Ayutla on the road to Mascota, *Barrie & Leidig 1041* (TEX, MEXU); Mpio. Cuautla, 7.6 km W of Los Volcanes on the road to Mascota, *Barrie & Leidig 1046* (TEX, MEXU); Cerro Viejo, Tlajomulco, *Diaz L. 1431* (MICH); Mpio. Talpa de Allende, Arroyo de las Cruces, *González T. 305* (ENCB); 9-11 km SE of Ahuacapan by air, *Judziewicz et al. 4914* (WIS); Mpio. Mazamitla, 3 mi S of Mazamitla, *McVaugh 12956* (MICH); Arroyo Sta Gertrudis, East of San Sebastián, *Mexia 1512* (CAS, F, GH, MICH, MO, NY, UC); Sierra de la Venta, W of Guadalajara, 15 Oct 1967, *Villarreal de Puga s. n.* (ENCB). **Mexico:** Mpio. San Jose de Allende, 15 km E of Mexico-Michoacan border on Hwy 15, *Cowan et al. 5746* (TEX); Mpio. Amecameca 1 km E de San Antonio, *Fanti 1047* (ARIZ, XAL); Mpio. Tlalmanalco, 1 km de N de Tlalmanalco, *García P. 213* (ARIZ, CAS, CHAPA, ENCB, MEXU, MO); Distr. Temascaltepec, Pantoja, *Hinton 2849* (GH, NY); Mpio. Valle de Bravo, 10 km N of Valle de Bravo, *Illis & Doebley 237* (CAS, ENCB, MEXU, WIS, XAL); Lagunas de Zempoala, *Lyonnet & Chávez 3393* (US); Jilotepec, *Matuda et al. 26890* (MEXU, MO); Oro de Hidalgo, *Matuda et al. 27693* (MEXU); Mpio. Sultepec, Sultepec, *Matuda et al. 27752* (MEXU, MO); Mpio. San Gerónimo, Villa de Carbón, *Matuda et al. 29230* (MEXU, MO); Flor de Maria, *Pringle 3234* (BR, F, GH, MEXU, MICH, MO, NY, UC, US, VT, W); Ixtaccíhuatl, *Purpus 1781* (F, GH, MO, NY, UC, US); Mpio. Tejupilco de Hidalgo, 5 km N of Tejupilco on Hwy 130, *Roe et al. 1564* (MEXU, MICH); 1 km SE de Cahuacán, *Rzedowski 18755* (CAS, ENCB, MEXU, MICH); Mpio. Texcoco, 8 km E de Coatlinchán, *Rzedowski 34550* (ENCB). **Michoacan:** Mpio. Morelia, Cerro Azul, *Arsène 3376* (GH, MO, NY, US); Loma Santa María, *Arsène 5424* (BR, MO, NY, US); 6-7 km N of Uruapan, *Dieterle 4393* (ENCB, MICH); Anganguero, *Hartweg 300* (NY, W); near Chupícuaro, 52 km W of Morelia, *Hernández H. 94* (ENCB); 18 km S of Patzcuaro, *King & Soderstrom 5180* (MEXU, MICH, TEX, UC); slopes above Tacambaro on road to Patzcuaro, *Moore & Wood 4805* (GH, MEXU, MICH, MO, UC, US); 12 km S de Villa Madero, *Soto 4762* (ENCB); between Chilchota & Zacapu on Hwy 15, *Weber & Charette 9902* (MEXU, MO, NY); Distr. Coalcoman, Sierra Torricillos, *Hinton 15629* (ARIZ, GH, LL, NY, TEX, US, W); Mpio. Villa Escalante, 1 km W de Agua Verde, *González G. et al. 518* (MEXU). **Morelos:** autopista México-Cuernavaca, km 53, *Espinosa 63* (MEXU); Valle de Tepeite, *Lyonnet 1839* (ENCB, MEXU, US); Cumbre Tres Marías, *Vázquez 2005* (MEXU). **Nayarit:** along the Arroyo Santa Rosa, W of Santa Teresa, *Breedlove 44460* (CAS); 10 mi SE of Ahuacatlan on rd to Barranca de Oro, *Feddema 348* (MICH); vicinity of Jalisco, *Ferris 8014* (CAS); 22 mi SE of Tepic on Hwy 15, *McVaugh 16423* (MICH); road to Santa Cruz, 6,3 mi W of Hwy 15, *Stevens & Fairhurst 2016* (ENCB,

MICH, MO); 25 km S of Tepic by road, *Webster & Breckon 15739* (CHAPA, MEXU, MICH, MO, TEX); Mpio. Santa Maria del Oro, 18 km NW of Chapopilla on road to Tepic, *Barrie & Gage 1240* (TEX); Mpio. Tepic, along road to Jalcocotlan ca. 8 mi W of Hwy 15, *Norris & Taranto 15011* (MEXU). **Oaxaca:** Chichahuaxtla, ca. 20 km SW of Tlaxiaco, *Ugent et al. 2763* (WIS). **Puebla:** San Miguel Tecxuanipa, *Boege 235* (MEXU); Exametla, ca. Orizaba, *Bourgeau 2945* (BR, GH, MY, US); Cerro Tonaquilo, ca. de Zacapoaxla, *Paray 2792* (ENCB); SE slopes of Popocatepetl, approached from Metepec, *Ugent et al. 1311* (WIS). **Sinaloa:** 3 km NE of El Palmito, *Breedlove 36454* (CAS); ca. 6 km W of Santa Lucia on road to Villa Union, *Feddema 1806* (MICH); Ocurague, Sierra Surotato, *Gentry 6251* (ARIZ, CAS, GH, MICH, MO, NY); Trail from El Batel to Pico del Aguila, *Mexia 461* (CAS, F, MO, UC); San Ignacio, Sierra de las Cruces, *Narváez M. & Salazar 103* (US); Badiraguato, 0.5 mi N of Los Hornos, *Breedlove & Kawahara 16788* (CAS); Mpio. Sinaloa y Vela, 6 mi NW of Los Hornos, *Breedlove & Thorne 18152* (CAS). **Veracruz:** La Joya, *Balls & Gourley B5515* (NY, UC); 4 mi W of Jalapa, *Norris & Taranto 16876* (CAS); Llano Grande, *Ventura A. 2242* (CAS, F, MICH, MO, TEX); Dos Hermanos, *Ventura A. 4026* (CAS, ENCB, MICH, WIS); Mpio. Acajete, 1 km W of Acajete, *Calzada & Delgado 4144* (F, NY, XAL); Mpio. Rafael Ramírez, ca. 4.5 km SE of Las Vigas, *Turner 15414* (TEX, XAL); Mpio. Tlacolulan, Tengonapa, *Ventura A. 17774* (ENCB, MEXU, XAL).

Valeriana urticifolia var. *scorpioides* is distinguished by the fruits and, in many populations, the lavender flowers. Rhombic-leaved individuals, a rarity in var. *urticifolia*, can be common, especially in the northern states. Like var. *urticifolia*, it is often found growing with other weedy biennial valerians.

There is a broad band along which the two varieties intergrade, stretching from Nayarit on the west through Jalisco and Michoacan, as far east as Pico de Orizaba, Veracruz. Populations in this region may have the fruits of one variety and the flowers of the other, or fruits in which the development and positioning of the lateral veins is intermediate. In the populations that I have observed in the field in Michoacan and Jalisco, the typical varietal forms do not occur in the same populations with the intermediates. As one moves north or south, away from this zone, the typical varieties emerge.

KEY TO SPECIES

- 1a. Plants rhizomatous or suffruticose or herbaceous vines, climbing or running along the ground 2
- 2a. Current season's growth emerging at the tips of short rhizomes; leaves basal, the cauline leaves reduced; anthers distinctly 4-lobed *V. arizonica* A. Gray
- 2b. Suffruticose or herbaceous vines; leaves cauline; anthers distinctly 2-lobed.
- 3a. Plants suffrutescent; if climbing, the stems not twining; leaves simple, elliptic or ovate; stamens of male-fertile flowers exserted 4
- 4a. Plants clambering over trees and shrubs or running along the ground; gynodioecious; corollas of perfect flowers 3.0-5.5 mm long; corollas of female flowers 1.8-3.0 mm long *V. subincisa* Benth.

- 4b. Plants climbers; dioecious; corollas of male flowers 1.8-3.6 mm long; corollas of female flowers rotate, 1.1-1.9 mm long *V. naidae* Barrie
- 3b. Herbaceous vines with twining stems; leaves ternate or simple; gynodioecious; corollas of perfect flowers tubular, stamens included or at the mouth of the tube 5
- 5a. Stems green or brown basally, terete throughout, leaves ternate *V. scandens* L.
- 5b. Stems green or red above, red or magenta below, 4-winged to the second or third leaf node, terete or quadrangular above; leaves simple and cordate, less commonly the base truncate *V. candolleana* Gardner
- 1b. Plants taprooted; erect biennial or perennial herbs 6
- 6a. Perennial herbs; leaves basal, cauline or both; stamens of male-fertile flowers weakly to strongly exerted 7
- 7a. Taproot narrowly obconic or cylindric; leaves spatulate or broadly petiolate, the blades simple and entire, pinnatifid, or divided; anthers 4-lobed 8
- 8a. Leaves and inflorescence branches in whorls of 3 to 5. Rio Mayo region, Chihuahua *V. lesueurii* Standl.
- 8b. Plants decussate throughout 9
- 9a. Basal leaves often deciduous by anthesis, entire or divided into 3 lobes, the terminal lobe elliptic, the lateral lobes obtriangular; cauline leaves well-developed, elliptic to lanceolate, in 2-6 pairs *V. procera* Kunth
- 9b. Basal leaves persistent throughout season, entire to 3-11-lobed, the lobes linear to elliptic, cauline leaves generally reduced, 1-3 pairs *V. edulis* Torrey & A. Gray
- 7b. Taproot napiform or fusiform; leaves pinnately compound, less commonly ternate or simple; anthers 2-lobed 10
- 10a. Leaves pinnately compound, with 8-18 pairs of lateral leaflets; leaflets obovate, obtrullate or dissected and subtended by ligulate or leaflet-like appendages; corollas with a sericeous collar within 11
- 11a. Plants hermaphroditic, gynodioecious or polygamodioecious; corollas of perfect flowers 3.2-6.0 mm long, infundibular; corollas of female flowers 2.4-3.2 mm long, rotate or infundibular 12
- 12a. Leaflets obovate or obtrullate, 3-11-lobed; corollas of perfect flowers 4.0-5.7 mm long, glabrous without; fruits ovate or pyriform, 3.5-5.7 mm long, glabrous *V. albonervata* B. L. Robins.
- 12b. Leaflets variously divided or dissected; corollas of perfect flowers 3.2-4.0 mm long and glabrous without, or 4.8-6.0 mm long and pubescent without 13
- 13a. Roots up to 20 cm in diameter, surmounted by numerous caudices; leaflets dissected, the terminal lobes straight or arcuate; corollas pubescent without; fruits ovate, uniformly pubescent *V. ceratophylla* Kunth
- 13b. Roots rarely over 5 cm in diameter, with 1 or up to 3 caudices; leaflets divided, the lobes straight; corollas glabrous without; fruit ovate or pyriform, glabrous or pubescent 14

- 14a. Plants hermaphroditic; basal leaves present at anthesis, cauline leaves absent; corollas uniformly white or pink; fruits uniformly pubescent or glabrous
 *V. nelsonii* Greenman
- 14b. Plants with perfect or female flowers; basal leaves absent in flower, cauline leaves well-developed; corolla lobes darker than the tube; fruits glabrous or pubescent adaxially
 *V. calcicola* Greenman
- 11b. Plants unisexual; corollas rotate, those of male flowers 2.4-4.1 mm long, those of female flowers 1.0-2.6 mm long 15
- 15a. Leaflets finely dissected; fruits ovate or widely ovate, 5.0-6.5 mm long, glabrous or pubescent basally
 *V. laciniosa* M. Martens & Galeotti
- 15b. Leaflets divided or coarsely dissected; fruits ovate or pyriform, 3.4-5.0 mm long 16
- 16a. Corollas of female flowers 1.0-1.2 mm long; fruits puberulent
 *V. zapotecana* Barrie
- 16b. Corollas of female flowers 1.9-2.6 mm long; fruits glabrous
 *V. otomiana* Barrie
- 10b. Roots rarely more than 5 cm in diameter; leaves simple, or more commonly compound, the lateral leaflets in 1-10 pairs, neither lacinate nor subtended by basal appendages; corollas glabrous to pubescent within, but lacking a well-defined, sericeous collar 17
- 17a. Basal leaves simple, absent throughout flowering and fruiting periods; cauline leaves reduced and bract-like, the bases connate, decussate or in whorls of three *V. vaginata* Benth.
- 17b. Basal leaves present at anthesis or, if absent, the cauline leaves well-developed; cauline leaves similar to basal leaves or somewhat reduced, but never bract-like; both types compound or, if simple, then with ternate or compound leaves generally present on the same plant 18
- 18a. Caudex well-developed, 5-10 cm long, 1-2 cm wide, bearing the remnants of old leaf bases; basal leaves 15-47 cm long, simple, ternate or compound with 3-5 leaflets 19
- 19a. Leaves simple or ternate; inflorescence corymboid; corollas of perfect flowers 4.2-4.8 mm long; fruits lanceolate or elliptic, the margins revolute. Chiapas and Oaxaca
 *V. cucurbitifolia* Standl.
- 19b. Leaves compound; inflorescence paniculoid; corollas of perfect flowers 3.0-3.7 mm long; fruits ovate, the margins entire. Hidalgo
 *V. moorei* Barrie
- 18b. Caudex poorly developed; old leaf bases rarely present; basal leaves less than 30 cm long, or, if up to 50 cm long, then with 6-10 pairs of lateral leaflets 20
- 20a. Inflorescence paniculoid 21

- 21a. Plants unisexual; basal and cauline leaves similar, lateral leaflets in 3-6 pairs *V. oaxacana* Barrie
- 21b. Plants with perfect or female flowers; basal leaves present or absent, simple and reduced or, more commonly, compound and larger than the cauline leaves, both types occurring on the same plant; lateral leaflets in 1-10 pairs, usually 1-3 22
- 22a. Leaves cauline only 23
- 23a. Plants less than 50 cm tall; the terminal leaflet widely ovate, the apex rounded; lateral leaflets in 1-3 pairs; corollas of perfect flowers 5.0-6.7 mm long, corollas of female flowers 3.0-3.9 mm long *V. densiflora* Benth.
- 23b. Plants 25-85 cm tall; the terminal leaflet ovate to obovate, the apex acute, the lateral leaflets in 1-8 pairs; corollas of perfect flowers 2.3-3.3 mm long, corollas of female flowers 1.5-2.3 mm long *V. rzedowskiorum* Barrie
- 22b. Leaves basal and cauline, the cauline leaves sometimes absent in late flower and fruit 24
- 24a. Plants 20-40 cm tall; leaflet size and shape often variable on a given leaf; cauline leaves with 3-6 pairs of lateral leaflets. Fir forests of northern Morelos and adjacent Mexico *V. retrorsa* Fern.
- 24b. Plants 50-150 cm tall; leaflets more consistent, though sometimes differing between basal and cauline leaves; cauline leaves with 1-4 pairs of lateral leaflets 25
- 25a. Bractlets equal to or slightly longer than the mature fruits; corollas of female flowers 1.5-1.8 mm long; fruits ovate, 2.1-2.6 mm long, pubescent adaxially *V. chiapensis* Barrie
- 25b. Bractlets 1/2 the length of the fruits or longer than the fruits; corollas of female flowers 2.1-3.1 mm long; fruits uniformly pubescent or glabrous 26
- 26a. Basal leaves with 1-3 pairs of lateral leaflets; fruits narrowly elliptic or lanceolate, 2.8-4.0 mm long, 1.1- 1.3 mm wide, glabrous, the margins revolute. Fir forests in central Guerrero *V. gallinae* Barrie

- 26b. Basal leaves with 6-10 pairs of lateral leaflets; fruits ovate to widely ovate, 1.9-3.6 mm long, 1.1-2.1 mm wide, uniformly pubescent, the margin entire. Durango to Guerrero
 *V. pilosiuscula* M. Martens & Galeotti
- 20b. Inflorescence corymboid 27
- 27a. Plants gynodioecious; roots simple, globose, cylindrical or turbinate; bracteoles much longer than mature fruits; the calyx plumose, rarely absent
 *V. deltoidea* F. G. Meyer
- 27b. Plants hermaphroditic; roots simple or with 2 to 10 lobes; bracteoles slightly shorter to slightly longer than mature fruits; the calyx reduced to a narrow ring or absent
 28
- 28a. Leaves pinnate or pinnatifid, the base attenuate; corollas 5.2-8.4 mm long, weakly if at all gibbous; fruits 4.9-6.0 mm long, 2.9-4.0 mm wide
 *V. pratensis* (Benth.) Steud.
- 28b. Leaves with 1-7 pairs of well-defined leaflets; corollas 3.0-4.7 mm long, gibbous; fruits 2.8-4.5 mm long, 1.2-2.4 mm wide, glabrous
 *V. pulchella* M. Martens & Galeotti
- 6b. Biennial herbs; leaves cauline; stamens of male-fertile plants included to exerted 29
- 29a. Leaves simple 30
- 30a. Leaves pinnatifid; fruit margins revolute *V. tanacetifolia* F. G. Meyer
- 30b. Leaves entire to dentate, never pinnatifid; fruits margins never revolute 31
- 31a. Flowers white, fruits rhombic or trullate. Eastern Michoacan and western Mexico state *V. selerorum* Graebn. & Loes.
- 31b. Flowers white or pink; fruits elliptic or ovate; widespread 32
- 32a. Flowers white, abaxial and adaxial surfaces of fruits similar in appearance, the margins uniformly thickened
 *V. urticifolia* Kunth var. *urticifolia*
- 32b. Flowers pink or white, fruit surfaces dissimilar, the abaxial lateral veins midway between the midvein and margins, the margins commonly granular
 *V. urticifolia* var. *scorpioides* (DC.) Barrie
- 29b. Leaves compound or with a few simple leaves on an otherwise compound-leaved plant 33
- 33a. Corollas rotate, those of perfect flowers 0.9-1.2 mm long, those of female flowers 0.5-0.6 mm long *V. robertianifolia* Briq.
- 33b. Corollas of perfect flowers infundibular, salverform or tubular, 1.4-6.0 mm long, those of female flowers infundibular or rotate, 0.9-2.2 mm long
 34

- 34a. Perfect flowers tubular, 1.4-2.5 mm long, petals usually reflexed; anthers included 35
- 35a. Leaves usually compound, rarely ternate or simple, carinate; bases of lateral leaflets strongly decurrent; fruits 2.2-4.4 mm long, ovate, ovate-oblong or rhombic, the margins alate
..... *V. palmeri* A. Gray
- 35b. Leaves invariably compound, weakly keeled or not; bases of the lateral leaflets cuneate or weakly decurrent; fruits 1.0-2.2 mm long, ovate or elliptic, the margins entire *V. sorbifolia* Kunth
- 34b. Perfect flowers infundibular or salverform, corolla lobes spreading or reflexed, anthers exerted 36
- 36a. Leaves ternate, the leaflets dissected and of equal size; calyx present or absent in fruit; corollas salverform, weakly if at all gibbous
..... *V. apiifolia* A. Gray
- 36b. Leaves simple, ternate or compound, if ternate, then the terminal leaflet noticeably larger than the laterals; corollas infundibular, gibbous 37
- 37a. Leaves simple or compound, both forms commonly on the same plant; lateral leaflets reduced, in 1-2 pairs; corollas 3.5-6.0 mm long 38
- 38a. Terminal leaflets elliptic or ovate, the margins entire or crenulate; fruits 2.6-3.6 mm long, 2.0-2.6 mm wide; ovate or elliptic *V. tzotzilana* Barrie
- 38b. The terminal leaflet ovate, oblate or reniform, the margins irregularly dentate or lobed; fruits 1.8-2.8 mm long, 0.8-1.2 mm wide, ovate or lanceolate
..... *V. bryophila* Barrie
- 37b. Leaves ternate or compound, rarely simple; the lateral leaflets well-developed, in 1-8 pairs; corollas of perfect flowers 2.8-3.5 mm long 39
- 39a. Lateral leaflets in 3-8 pairs, the terminal leaflets ovate or widely ovate, the base cuneate or truncate; the corollas of female flowers 1.3-1.5 mm long; the surface of the fruits smooth
..... *V. barbareifolia* M. Martens & Galeotti
- 39b. Lateral leaflets in 1-3 pairs, the terminal leaflet ovate, the base cordate, rarely truncate; corollas of female flowers 0.6-1.1 mm long; surface of fruits tuberculate
..... *V. mexicana* DC.

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